

MATHEMATICAL TABLES

**FROM HANDBOOK OF
CHEMISTRY AND PHYSICS**

EIGHTH EDITION

Compiled by

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Preface

The collection of mathematical tables and formulae, originally published in the Handbook of Chemistry and Physics was intended to provide tables of logarithms, trigonometric functions, numerical constants and mathematical formulae and equations adequate for the ordinary computations of chemistry and physics. The convenience of form and completeness of the collection led to many requests for a separate publication, which would make the tables more readily available for general computation and reference or for use by students of mathematics.

Since the first publication of the separate Mathematical Tables extensive additions and revisions have been made, the current editions presenting more than twice the material of the original volume.

Every precaution has been used to insure accuracy in the numerical values, the proofs having been read repeatedly and against several sources where possible. A large portion of the material has been computed especially for this volume. Notice of any errors which may be discovered will be sincerely appreciated.

In addition to suggestions and contributions from a large number of users of the book we wish especially to acknowledge the valuable collaboration of the following persons:

Albert A. Bennett, Brown University
W. Bruce Ross, McGill University

B. H. Brown, Dartmouth College

James W. Glover, University of Michigan

D. A. Hill, the Ohio Public Service Company.

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Preface to the Eighth Edition

Two important additions have been made in recent editions of the Mathematical Tables.

A fifteen page table of natural secants and cosecants for angles in degrees and minutes has been added in response to the need developed by the increased use of computing machines.

The second important addition is a rather extensive collection of mathematical abbreviations and symbols covering about twenty-two pages which has been compiled by Professor Albert A. Bennett of Brown University.

A small table for conversion of angles from arc to time has been added.

In response to several requests a collection of conversion factors and numerical constants has been assembled in a convenient location at the front of the volume.

A small number of minor corrections and revisions have been made in various portions of the volume. No error has been discovered in the numerical values given in any of the major tables since the last printing.

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USE OF MATHEMATICAL TABLES

For a complete discussion of the principles and use of mathematical tables, textbooks on the subject should be consulted. The following brief statements are intended to give only sufficient information to make possible the intelligent use of the tables, omitting for the most part any attempt at treating the theory and principles.

Exponential Method of Expressing Numbers—For convenience in writing and manipulation, numbers are often expressed as factors of appropriate powers of 10. The following examples will illustrate:

| | | |
|----------------|----------------|-----------------------|
| 2,380,000,000. | may be written | 2.38×10^9 |
| 238. | may be written | 2.38×10^2 |
| .238 | may be written | 2.38×10^{-1} |
| .000000238 | may be written | 2.38×10^{-7} |

Logarithms—The logarithm of a number is the exponent of that power to which another number, the base, must be raised to give the number first named. Any positive number greater than 1 might serve as a base. Two have been selected, yielding two systems of logarithms. One base, 2.718 . . . usually indicated by the letter *e*, gives rise to a system of logarithms convenient in higher mathematics. These are called natural, Napierian, or hyperbolic logarithms. Reference will be made to their use in a subsequent paragraph.

The other base used is 10, giving logarithms particularly adapted to use in computation, called common or Briggian logarithms. Tables of logarithms given without designation are invariably of this latter type.

Since most numbers are incommensurable powers of ten, a common logarithm, in general, consists of an integer which is called the characteristic and an endless decimal, the mantissa.

It is to be observed that the common logarithms of all numbers expressed by the same figures in the same order with the decimal point in different positions have different characteristics but the same mantissa. To illustrate:—if the decimal point stand after the first figure of a number, counting from the left, the characteristic is 0; if after two figures, it is 1; if after three figures, it is 2, and so forth. If the decimal point stand before the first significant figure the characteristic is -1 , usually written $\bar{1}$; if there is one zero between the decimal point and the first significant figure it is $\bar{2}$ and so on. For example: $\log 256 = 2.40824$, $\log 2.56 = 0.40824$, $\log 0.256 = \bar{1}.40824$, $\log 0.00256 = \bar{3}.40824$. The two latter are often written $\log 0.256 = 9.40824 - 10$, $\log 0.00256 = 7.40824 - 10$.

USE OF MATHEMATICAL TABLES (Continued)

A method of determining characteristics of logarithms is to write the number with one figure to the left of the decimal point multiplied by the appropriate power of 10. The characteristic is then the exponent used. For example:

$$256,000,000 = 2.56 \times 10^8 \quad \log = 8.40824$$

$$0.000000256 = 2.56 \times 10^{-7} \quad \log = \overline{7}.40824 \text{ or } 3.40824 - 10$$

Inasmuch as the characteristic may be determined by inspection the mantissas only are given in tables of common logarithms.

To find the logarithm of a number:

For a number of four figures, take out the tabular mantissa on a line with the first three figures of the number and under its fourth figure. The characteristic is determined as previously explained.

For a number of less than four figures, supply zeros to make a four figure number and take the value of the mantissa from the tables as before. For example: $\log 2 = \log 2.000 = 0.30103$.

For a number of more than four figures, take the tabular value of the mantissa for the first four figures; find the difference between this mantissa and the next greater tabular mantissa and multiply the difference so found by the remaining figures of the number as a decimal and add the product to the mantissa of the first four figures. For example: to find $\log 46.762$.

$$\log 46.76 = 1.66987$$

Tabular difference between this mantissa and that for 4677 is .00010.

$$\begin{aligned} \therefore \log 46.762 &= 1.66987 + .2 \times .00010 \\ &= 1.66987 + .00002 \\ &= 1.66989 \end{aligned}$$

To find the number corresponding to a given logarithm:

If the mantissa is found exactly in the table, join the figure at the top which is directly above the given mantissa to the three figures on the line at the left and place the decimal point according to the characteristic of the logarithm. For example, $\log^{-1}(\text{antilogarithm}) 3.39967 = 2510$.

If the mantissa is not found exactly in the table it is necessary to interpolate. For example, $\log^{-1} 3.40028 = 2513. + \frac{9}{13} = 2513.5$.

The column of proportional parts at the right of each page of the table shows, under the heading of the various tabular differences, the parts of these differences which correspond to the digits from 1 to 9 in the fifth place. This makes it possible to take out a logarithm for a five figure number or to find an antilogarithm of the same number of significant figures with increased facility, usually by inspection.

USE OF MATHEMATICAL TABLES (Continued)

The following formulae express the relations on which the use of logarithms is based:

$$\log ab = \log a + \log b$$

$$\log \frac{a}{b} = \log a - \log b$$

$$\log a^n = n \times \log a$$

$$\log \sqrt[n]{a} = \frac{\log a}{n}$$

The following examples will serve as illustrations:

1. $52600 \times 0.00381 \times 2.74 = 549.1$

$$\log 52600 = 4.72099$$

$$\log 0.00381 = \bar{3}.58092$$

$$\log 2.74 = 0.43775$$

$$\text{Sum:} = 2.73966$$

$$\text{Antilogarithm} = 549.1$$

The sum is the logarithm of the product, the mantissa of which is 73966. On looking up this mantissa in the logarithm tables we see that it corresponds to the digits 5491. The characteristic is 2, hence there are three figures before the decimal point. The number corresponding to the logarithm, called the antilogarithm, is 549.1.

2. $0.00123 \div 52.7 = 0.00002334$ An Alternative method:

$$\log 0.00123 = \bar{3}.08991 \qquad \log 0.00123 = 7.08991 - 10$$

$$\log 52.7 = 1.72181 \qquad \log 52.7 = 1.72181$$

$$\text{Subtracting} \quad \bar{5}.36810 \qquad 5.36810 - 10$$

$$\text{Antilog} \quad 0.00002334$$

The characteristic $\bar{5}$ (5. -10) shows four zeros after the decimal point before the first significant figure.

3. $\frac{273 \times 780}{292 \times 760} \times 15 \times 0.09 = 1.295$

$$\log 273 = 2.43616 \qquad \log 292 = 2.46538$$

$$\log 780 = 2.89209 \qquad \log 760 = 2.88081$$

$$\log 15 = 1.17609$$

$$\log 0.09 = \bar{2}.95424 \qquad \log \text{denominator} = 5.34619$$

$$\log \text{sum} = 5.45858$$

$$\log \text{numerator} = 5.45858$$

$$\log \text{denominator} = 5.34619$$

$$\text{subtracting} = 0.11239$$

$$\text{antilogarithm} = 1.295$$

USE OF MATHEMATICAL TABLES (Continued)

As division may be accomplished by multiplying by the reciprocal of a number, the above may be considerably simplified. The logarithm of the reciprocal of a number, called the cologarithm, is readily obtained from the table by subtracting the logarithm of the number from zero. This may readily be read off from the table of mantissas. Change the sign of the characteristic algebraically adding to it -1 , then mentally subtract each figure of the mantissa from 9 proceeding from left to right, the last figure being subtracted from 10. The example then is:

$$\begin{array}{rcl} \log 273 & = & 2.43616 \\ \log 780 & = & 2.89209 \\ \log 15 & = & 1.17609 \\ \log 0.09 & = & \overline{2}.95424 \\ \text{colog } 292 & = & \overline{3}.53462 \\ \text{colog } 760 & = & \overline{3}.11919 \end{array}$$

$$\hline 0.11239$$

4. $(0.00098)^4 = 9.224 \times 10^{-13}$ An alternative method:
 $\log 0.00098 = \overline{4}.99123$ $\log 0.00098 = 6.99123 - 10$

| | | |
|-------------------------|----------------|--------------------|
| | <u>4</u> | <u>4</u> |
| | 3.96492(a) | 27.96492-40 |
| $\overline{4} \times 4$ | <u>16.</u> (b) | or 7.96492-20 |
| | | or <u>13.96492</u> |

$$\log (0.00098)^4 = \overline{13}.96492$$

$$\text{antilog} = 9.224 \times 10^{-13} \quad (c) \quad \text{antilog} = 9.224 \times 10^{-13}$$

In the above it will be noted that the mantissa is always positive hence the multiplication of the mantissa shown at (a) while (b) shows the multiplication of the characteristic. (c) is the algebraic sum.

5. $\sqrt[5]{492} = 3.455$

$$\log 492 = 2.69197$$

Dividing the logarithm by 5 gives as the logarithm of the root 0.53839 the antilogarithm of which is 3.455 both characteristic and mantissa being positive. When the characteristic is negative and not evenly divisible by the root to be taken a modification of the logarithm is necessary.

6. $\sqrt[3]{0.000372} =$

$$\begin{array}{rcl} \log 3.72 \times 10^{-4} & = & \overline{4}.57054 \quad (a) \\ & = & 26.57054 - 30 \quad (b) \end{array}$$

dividing (b) by 3 gives 8.85685-10 which may be written

USE OF MATHEMATICAL TABLES (Continued)

$\bar{2}.85685$ and is the logarithm of the root sought, the antilogarithm of which is 0.07192 .

$$\begin{aligned} 7. \quad 0.000372^{1.2} &= 0.000076674 \\ \log 0.000372 &= \bar{4}.57054 \\ &\text{or } 6.57054 - 10 \\ &\qquad\qquad\qquad 1.2 \end{aligned}$$

$$\begin{aligned} &7.88465 - 12 \\ \text{antilogarithm } &0.000076674 \end{aligned}$$

Four-Place Logarithms—This short table on two facing pages makes possible logarithmic computation precise to four significant figures, (three without interpolation). The mantissa is given complete and the proportional parts indicated for each line.

Four-Place Antilogarithms—Some computers prefer to use separate tables for determining antilogarithms; the table being entered from the margins with the logarithm and the number being found in the body of the table. Such a table is given to accompany the four-place logarithms.

Five-Place Logarithms—For computation involving five significant figures, (four without interpolation) the five-place table will be adequate. Since the first two figures will be the same for several lines of the table they are given in the first line only. The point at which these first two figures change is indicated by an asterisk. While space does not permit the proportional parts for each line, tables will be found for each tabular difference.

The supplementary table following the five-place logarithms, giving seven-place logarithms for numbers of five significant figures from 10,000 to 12,000 will be found convenient to increase precision and avoid the inconvenience of interpolation where the differences are large.

Logarithms of the Trigonometric Functions—Logarithms of the functions are given for each minute from $0-360^\circ$.

The quantity -10 is to be appended to all logarithms of the sine and cosine, to logarithms of the tangent from $0-45^\circ$ and of the cotangent from $45-90^\circ$.

With degrees indicated at either side of the top of the page use the column headings at the top. With degrees stated at the bottom of the page use the column designations at the bottom.

With degrees at the left (top or bottom) use the minute column at the left, and with degrees on the right side of the page use the minute column at the right.

USE OF MATHEMATICAL TABLES (Continued)

To illustrate the proper employment of headings for angles in the four quadrants—

$$\begin{array}{ll} \log \sin 6^\circ 24' = 9.04715 - 10 & \log \sin 186^\circ 24' = 9.04715 - 10 \\ \log \sin 83^\circ 15' = 9.99698 - 10 & \log \sin 263^\circ 15' = 9.99698 - 10 \\ \log \cos 96^\circ 41' = 9.06589 - 10 & \log \cos 276^\circ 41' = 9.06589 - 10 \\ \log \cos 173^\circ 49' = 9.99747 - 10 & \log \cos 353^\circ 49' = 9.99747 - 10 \end{array}$$

For the accurate determination of values where the tabular differences are large, the values of CS and CT are given. The following equations indicate their use.

To find the logarithm of the functions of an angle:

For angles $0-3^\circ$

For angles $87-90^\circ$

$$\begin{array}{ll} \log \sin \theta = \log \theta'' - \text{CS} & \log \cos \theta = \log (90^\circ - \theta)'' - \text{CS} \\ \log \tan \theta = \log \theta'' - \text{CT} & \log \cot \theta = \log (90^\circ - \theta)'' - \text{CT} \\ \log \cot \theta = \text{colog } \tan \theta & \log \tan \theta = \text{colog } \cot \theta \end{array}$$

To find the angle:

For angles $0-3^\circ$

For angles $87-90^\circ$

$$\begin{array}{ll} \log \theta'' = \log \sin \theta + \text{CS} & \log (90^\circ - \theta)'' = \log \cos \theta + \text{CS} \\ \log \theta'' = \log \tan \theta + \text{CT} & \log (90^\circ - \theta)'' = \log \cot \theta + \text{CT} \end{array}$$

In the above expressions, θ'' and $(90^\circ - \theta)''$ are used to indicate the value of the angles expressed in seconds. The values in the body of the table are the cologarithms and should be used as indicated above.

The values of the logarithms S and T are also given in a separate table. For these the following relations hold:

To find the functions of an angle.

$$\begin{array}{ll} \log \sin \theta = \log \theta'' + S & \log \cos \theta = \log (90^\circ - \theta)'' + S \\ \log \tan \theta = \log \theta'' + T & \log \cot \theta = \log (90^\circ - \theta)'' + T \end{array}$$

To find the angle.

$$\begin{array}{ll} \log \theta'' = \log \sin \theta - S & \log (90^\circ - \theta)'' = \log \cos \theta - S \\ \log \theta'' = \log \tan \theta - T & \log (90^\circ - \theta)'' = \log \cot \theta - T \end{array}$$

Where the values of CS and CT are given, the angles expressed in seconds are given in the supplementary column at the left.

The tabular differences are given under the headings "d" and "c.d.", the latter referring to the common difference for the tangent and cotangent. Tables of proportional parts ("P.P.") facilitate interpolation. At the bottom of each column will be found special proportional parts between the tabular differences for the tangent or cotangent and those for the sine or cosine. These are useful when one function is to be obtained directly from the other without determining the angle.

For example, suppose $\log \tan \theta$ is given as 9.67644 and $\log \cos \theta$ is required. The difference between the given logarithm and that given in the table, 9.67622 (opposite $25^\circ 23'$), is 22.

USE OF MATHEMATICAL TABLES (Continued)

The tabular differences of the two logarithmic functions at this place are 32 and 6. In the proportional table for $\frac{6}{32}$, 22 corresponds to 4; this, subtracted from the tabular logarithmic cosine 9.95591, gives the required $\log \cos \theta = 9.95587$.

The symbols $\bar{5}$ and $\dot{5}$ are used to indicate how the terminal 5 has been derived. For example, the logarithm 8.8307 $\bar{5}$ is more fully given as 8.8307495 while the value 9.4082 $\dot{5}$ is derived from 9.4082539.

Natural Trigonometric Functions—Values of the natural trigonometric functions of angles are given for each minute from 0–360°.

For degrees indicated at the top of the page use the column headings at the top. For degrees indicated at the bottom use the column indications at the bottom.

With degrees at the left of each block (top or bottom), use the minute column at the left and with degrees at the right of each block use the minute column at the right.

Natural Functions and their Logarithms are given for angles in degrees and tenths from 0 to 90 degrees.

Natural Functions and their Logarithms are given for angles in radians and hundredths, from 0 to 2 radians.

Haversines—Values of $(1 - \cos \theta)/2$ for angles between 0 and 180° are given to four significant figures. The four-place mantissas of the logarithms of the haversines are also given. The correct characteristic must be provided in each case.

The listed values of the haversines were derived from values which were computed to seven significant figures. The logarithms were independently derived from the more exact values of the haversines and are, therefore, in many cases not the exact value of the logarithm of the haversine as listed. This is notably true at the beginning of the table where the logarithm can be given with more exactness than the function.

Natural Logarithms—The natural logarithms of numbers are presented in a group of tables. To find logarithms not included in the tables, the following method is used:

To find the logarithm of a number which is $\frac{1}{10}$ or 10 times etc. a number whose logarithm is given, subtract from or add to the given logarithm the logarithm of 10.

$$\begin{aligned}\text{Thus } \log 1.6 &= \log 16 - \log 10 \\ \log 160 &= \log 16 + \log 10 \text{ etc.}\end{aligned}$$

Table A gives logarithms of numbers from 0.00 to 0.99. –10 should be appended to each. For instance: $\log 0.48 = 9.266 - 10$

Table B gives logarithms of numbers from 1.00 to 10.09. For example: $\log 4.86 = 1.58104$

USE OF MATHEMATICAL TABLES (Continued)

Table **C** gives logarithms of numbers from 10 to 99. For example: $\log_e 48 = 3.87120$

Table **D** gives logarithms of numbers from 100 to 1109. For example: $\log_e 486 = 6.18621$

Exponential Functions—Values of e^x , $\log e^x$ and e^{-x} where e is the base of the natural system of logarithms 2.71828 . . . and x has values from 0 to 10. Facilitating the solution of exponential equations, these tables also serve as a table of natural or Napierian antilogarithms. For instance if the logarithm or exponent $x = 3.26$ the corresponding number or value of e^x is 26.050. Its reciprocal e^{-x} is .038388.

Hyperbolic Functions—The table gives the values and logarithms of the hyperbolic sine x , cosine x , tangent x and cotangent x for values of x from 0 to 5.

Degrees-Radians—This table gives the value in radians to five significant figures; for each 10 minutes from $0^\circ 0'$ to $90^\circ 0'$; for each degree from 90 to 180; for each 10 degrees from 180 to 480. Values are also given for each minute from $0-60'$ and for each second from $0-60''$.

Tables are also provided to facilitate changing from degrees and decimal fractions to radians, from decimal fractions of a degree to minutes and seconds and the reverse operations.

Numerical Tables—The first section gives the reciprocals of numbers from 0 to 1000 and circumferences and areas of circles with diameters having these values. Reciprocals and circumferences for values not listed can be obtained by an appropriate shift of the decimal point.

The second section is devoted to squares, cubes and roots. The squares and cubes from 1 to 1000 are given exactly. The roots are given to seven significant figures. Since the square roots of $10n$ are given, values of the square roots from 1 to 10,000 may be found directly. For the square roots of numbers below and above this range, use may be made of the following relations: $\sqrt{100n} = 10\sqrt{n}$; $\sqrt{1000n} = 10\sqrt{10n}$; $\sqrt{\frac{1}{10}n} = \frac{1}{10}\sqrt{10n}$; $\sqrt{\frac{1}{100}n} = \frac{1}{10}\sqrt{n}$; $\sqrt{\frac{1}{1000}n} = \frac{1}{100}\sqrt{10n}$. For example, the square root of 0.268 may be found by using the form, $\sqrt{0.268} = \frac{1}{100}\sqrt{10 \times 268}$. The tabular value for the square root of $10n$ for 268 is 51.76872. Hence, the desired root is 0.5176872.

Values of cube roots for all numbers from 1 to 100,000 will be found directly in the table. Cube roots for numbers above or below this range will be found from the following relations: $\sqrt[3]{1000n} = 10\sqrt[3]{n}$; $\sqrt[3]{10,000n} = 10\sqrt[3]{10n}$; $\sqrt[3]{100,000n} = 10\sqrt[3]{100n}$; $\sqrt[3]{\frac{1}{10}n} = \frac{1}{10}\sqrt[3]{100n}$; $\sqrt[3]{\frac{1}{100}n} = \frac{1}{10}\sqrt[3]{10n}$; $\sqrt[3]{\frac{1}{1000}n} = \frac{1}{10}\sqrt[3]{n}$. For example, the cube root of 731,000 may be found

USE OF MATHEMATICAL TABLES (Continued)

by using the form, $\sqrt[3]{731,000} = 10\sqrt[3]{731}$. The tabular value of the root for 731 is 9.008223. The desired root is, therefore, 90.08223.

Powers of Numbers—This table is given to supplement the values of squares and cubes of numbers found in the preceding numerical table. The larger numbers are expressed exponentially to at least seven significant figures. The approximate value written as a whole number may be obtained by shifting the decimal point to the right by the number of places indicated in the exponent of 10 shown at the head of each group of values. For example: the approximate value of 33^8 is found in the table as 14.064086×10^{11} . Written as a whole number it is 1,406,408,600,000.

Factorials and their Logarithms—The product $n \times (n - 1) \times (n - 2) \times \dots \times 1$ is called factorial n , expressed as $n!$ or $[n$. For example: factorial 5 = $5 \times 4 \times 3 \times 2 \times 1 = 120$. Factorials are very often met with in series. For purposes of computation in such cases the table giving the values of the factorials and of their logarithms for numbers from 1 to 100 is provided. The values of the factorials are expressed exponentially to 5 significant figures.

A brief table of exact values and reciprocals of factorials is to be found on page 155.

Factors for Computing Probable Errors—The probable error of a series of n measures $a_1, a_2, a_3 \dots a_n$, the mean of which is m , is given by the expression,

$$e = \frac{0.6745}{\sqrt{n-1}} \sqrt{(m - a_1)^2 + (m - a_2)^2 + \dots (m - a_n)^2}$$

The probable error of the mean is,

$$E = \frac{0.6745}{\sqrt{n(n-1)}} \sqrt{(m - a_1)^2 + (m - a_2)^2 + \dots (m - a_n)^2}$$

The following approximate equations are convenient forms for computation,

$$e = 0.8453 \frac{\Sigma d}{\sqrt{n(n-1)}}$$

$$E = 0.8453 \frac{\Sigma d}{n\sqrt{n-1}}$$

The symbol Σd represents the arithmetical sum of the deviations.

For convenience in computing the probable error the value of several of the factors involved is given for values of n from 2 to 100.

USE OF MATHEMATICAL TABLES (Continued)

Probability of Occurrence of Deviations—The significance of deviations is indicated by this table. The probability of occurrence of deviations as great as or greater than any specific value is given for various ratios of deviation to probable error and also with respect to the standard deviation σ . The probability of occurrence is stated in per cent or chances in 100. The odds against occurrence are also stated. The probable error is $0.6745 \times (\sigma)$.

Areas, Ordinates and Derivatives of the Normal Curve of Error—If, for a large number of observations, the frequency y , of the occurrence of an error of magnitude t be plotted, a curve results whose equation may be written,

$$y = \frac{1}{\sqrt{2\pi}} e^{-t^2/2}$$

The area, ordinates and derivatives for this curve given in the table are useful in the treatment of observational data. A text on statistical methods should be consulted for a complete explanation.

Factors and Primes—The table presents the prime factors of *all* factorable numbers and the logarithms of all prime numbers from 1 to 2000.

Conversion Table

| Inches | | Centimeters | Centimeters | | Inches |
|--------|---|-------------|-------------|---|----------|
| 1 | = | 2.54001 | 1 | = | 0.39370 |
| 2 | = | 5.08001 | 2 | = | 0.78740 |
| 3 | = | 7.62002 | 3 | = | 1.1811 |
| 4 | = | 10.16002 | 4 | = | 1.5748 |
| 5 | = | 12.70003 | 5 | = | 1.9685 |
| 6 | = | 15.24003 | 6 | = | 2.3622 |
| 7 | = | 17.78004 | 7 | = | 2.7559 |
| 8 | = | 20.32004 | 8 | = | 3.1496 |
| 9 | = | 22.86005 | 9 | = | 3.5433 |
| Feet | | Meters | Meters | | Feet |
| 1 | = | 0.304801 | 1 | = | 3.28083 |
| 2 | = | 0.609601 | 2 | = | 6.56167 |
| 3 | = | 0.914402 | 3 | = | 9.84250 |
| 4 | = | 1.219202 | 4 | = | 13.12333 |
| 5 | = | 1.524003 | 5 | = | 16.40417 |
| 6 | = | 1.828804 | 6 | = | 19.68500 |
| 7 | = | 2.133604 | 7 | = | 22.96583 |
| 8 | = | 2.438405 | 8 | = | 26.24666 |
| 9 | = | 2.743205 | 9 | = | 29.52750 |
| Yards | | Meters | Meters | | Yards |
| 1 | = | 0.914402 | 1 | = | 1.093611 |
| 2 | = | 1.828804 | 2 | = | 2.187222 |
| 3 | = | 2.743205 | 3 | = | 3.280833 |
| 4 | = | 3.657607 | 4 | = | 4.374444 |
| 5 | = | 4.572009 | 5 | = | 5.468056 |
| 6 | = | 5.486411 | 6 | = | 6.561667 |
| 7 | = | 6.400813 | 7 | = | 7.655278 |
| 8 | = | 7.315215 | 8 | = | 8.748889 |
| 9 | = | 8.229616 | 9 | = | 9.842500 |

USE OF MATHEMATICAL TABLES (Continued)

Conversion Tables (Continued)

| Miles | Kilometers | Kilometers | Miles |
|------------|------------|------------|------------|
| 1 | 1.60935 | 1 | 0.62137 |
| 2 | 3.21869 | 2 | 1.24274 |
| 3 | 4.82804 | 3 | 1.86411 |
| 4 | 6.43739 | 4 | 2.48548 |
| 5 | 8.04674 | 5 | 3.10685 |
| 6 | 9.65608 | 6 | 3.72822 |
| 7 | 11.26543 | 7 | 4.34959 |
| 8 | 12.87478 | 8 | 4.97096 |
| 9 | 14.48412 | 9 | 5.59233 |
| Pounds Av. | Kilograms | Kilograms | Pounds Av. |
| 1 | 0.45359 | 1 | 2.20462 |
| 2 | 0.90718 | 2 | 4.40924 |
| 3 | 1.36078 | 3 | 6.61387 |
| 4 | 1.81437 | 4 | 8.81849 |
| 5 | 2.26796 | 5 | 11.02311 |
| 6 | 2.72155 | 6 | 13.22773 |
| 7 | 3.17514 | 7 | 15.43236 |
| 8 | 3.62874 | 8 | 17.63698 |
| 9 | 4.08233 | 9 | 19.84160 |

Conversion Factors

U. S. AND METRIC UNITS

Each unit in bold face type is followed by its equivalent in one or other units of the same quantity.

Acre—0.0015625 square mile; 4.3560 $\times 10^4$ square feet; 0.4046873 hectare

Bushel—1.2444 cubic feet; 2150.42 cubic inches; 0.035239 cubic meter; 35.238 liters

Centimeter—0.032808 foot; 0.39370 inch.

Circular Mil.— 7.854×10^{-7} square inch; 5.0671×10^{-6} square centimeter

Cubic Centimeter—0.061023 cubic inch; 0.27051 dram; 16.231 minims; 0.99997 milliliter

Cubic Foot—0.80357 bushel; 7.481 gallon; 0.02831701 cubic meter; 28.316 liters

Cubic Inch—16.387162 cubic centimeters

Cubic Meter—35.314445 cubic feet; 264.173 gallons

Foot—0.3048006 meter

Gallon—0.13368 cubic foot; 0.83268 gallons (British); 231.00 cubic inches; 0.0037854 cubic meter; 3.7853 liters

Grain—0.064798918 gram

Gram—0.00220462 pound (avoirdupois); .0352740 ounce (avoirdupois); 15.4324 grains

Hectare—2.471044 acres; 1.0764 $\times 10^6$ square feet

Inch—2.540005 centimeter

Kilogram—2.2046223 pounds (avoirdupois)

Kilometer—0.62137 mile

Liter—0.26417762 gallon; 0.035316 cubic foot; 1.056710 quarts

Meter—1.093611 yards; 3.280833 feet; 39.3700 inches

Mile—1.60935 kilometers

Ounce (fluid)—1.80469 cubic inches; 29.5737 cubic centimeters

Ounce (avoirdupois)—28.349527 grams

Ounce (apothecary or troy)—31.103481 grams

Pint (liquid)—0.473167 liter; 473.179 cubic centimeters

Pound (avoirdupois)—0.453592 kilogram; 453.5924 grams

Pound (apothecary or troy)—0.3732418 kilogram; 373.2418 grams

Quart—1.10120 liters

Quart (liquid)—.946333 liter

Radian—57.29578 degrees

Rod—5.029210 meters

Square Centimeter—0.15500 square inches

Square Foot—0.09290341 square meter

Square Inch—645.16258 square millimeters

Square Meter—10.76387 square feet

Square Yard—0.83613 square meter

Ton (short)—907.185 kilograms

Yard—0.91440183 meter

NUMERICAL CONSTANTS

Numbers Containing π

$$\pi = 3.14159\ 26536 \quad \log_{10} \pi = 0.49714\ 98727 \quad \log_e \pi = 1.14472\ 98858$$

| | Number | Logarithm | | Number | Logarithm |
|------------|-------------|---------------|----------------------------------|-------------|---------------|
| π | 3.1415 927 | 0.4971 499 | π^2 | 9.8696 044 | 0.9942 997 |
| 2π | 6.2831 853 | 0.7981 799 | $2\pi^2$ | 19.7392 088 | 1.2953 297 |
| 3π | 9.4247 780 | 0.9742 711 | $4\pi^2$ | 39.4784 176 | 1.5963 597 |
| 4π | 12.5663 706 | 1.0992 099 | $1/\pi^2$ | 0.1013 212 | 9.0057 003-10 |
| 8π | 25.1327 412 | 1.4002 399 | $1/(2\pi^2)$ | 0.0506 606 | 8.7046 703-10 |
| $\pi/2$ | 1.5707 963 | 0.1961 199 | $1/(4\pi^2)$ | 0.0253 303 | 8.4036 403-10 |
| $\pi/3$ | 1.0471 976 | 0.0200 286 | $\sqrt{\pi}$ | 1.7724 539 | 0.2485 749 |
| $\pi/4$ | 0.7853 982 | 9.8950 899-10 | $\sqrt{\pi/4}$ or $\sqrt{\pi}/2$ | 0.8862 269 | 9.9475 449-10 |
| $\pi/6$ | 0.5235 988 | 9.7189 986-10 | $\sqrt{\pi/4}$ | 0.4431 135 | 9.6465 149-10 |
| $\pi/8$ | 0.3926 991 | 9.5940 599-10 | $\sqrt{\pi/2}$ | 1.2533 141 | 0.0980 599 |
| $2\pi/3$ | 2.0943 951 | 0.3210 586 | $\sqrt{2/\pi}$ | 0.7978 846 | 9.9019 401-10 |
| $4\pi/3$ | 4.1887 902 | 0.6220 886 | π^3 | 31.0062 767 | 1.4914 496 |
| $1/\pi$ | 0.3183 099 | 9.5028 501-10 | $\sqrt[3]{\pi}$ | 1.4645 919 | 0.1657 166 |
| $2/\pi$ | 0.6366 198 | 9.8038 801-10 | $1/\sqrt[3]{\pi}$ | 0.6827 841 | 9.8342 834-10 |
| $4/\pi$ | 1.2732 395 | 0.1049 101 | $\sqrt[3]{\pi^2}$ | 2.1450 294 | 0.3314 332 |
| $1/(2\pi)$ | 0.1591 549 | 9.2018 201-10 | $1/\sqrt{\pi}$ | 0.5641 896 | 9.7514 251-10 |
| $1/(4\pi)$ | 0.0795 775 | 8.9007 901-10 | $2/\sqrt{\pi}$ or $\sqrt{4/\pi}$ | 1.1283 792 | 0.0524 551 |
| $1/(6\pi)$ | 0.0530 516 | 8.7246 989-10 | | | |
| $1/(8\pi)$ | 0.0397 887 | 8.5997 601-10 | | | |

Logarithmic Constants

$$e = 2.71828\ 18285 \quad M = \log_{10} e = 0.43429\ 44819$$

$$1/M = \log_e 10 = 2.30258\ 50930 \quad \log_{10} M = \log_{10} \log_{10} e = 9.63778\ 43113$$

$$\log_e 2 = 0.69314\ 71806 \quad 1/e = 0.36787\ 94412$$

$$\log_{10} 2 = 0.30102\ 99957$$

Change of Base

$$\log_a x = \log_b x / \log_b a$$

$$\log_{10} x = \log_e x / \log_e 10 \quad \log_e x = \log_{10} x / \log_{10} e$$

$$\log_e x = 1/M \log_{10} x = 2.30258\ 50930 \log_{10} x$$

$$\log_{10} x = M \log_e x = 0.43429\ 44819 \log_e x$$

DECIMAL EQUIVALENTS OF COMMON FRACTIONS

| | | | | |
|--------|---------|------------------|---------|-------------------|
| $1/16$ | $1/32$ | $2/64 = 0.03125$ | $17/32$ | $34/64 = 0.53125$ |
| | $2/32$ | $4/64 = .0625$ | $9/16$ | $18/32$ |
| | $3/32$ | $6/64 = .09375$ | | $36/64 = .5625$ |
| $1/8$ | $4/32$ | $8/64 = .125$ | | $19/32$ |
| | $5/32$ | $10/64 = .15625$ | $5/8$ | $38/64 = .59375$ |
| $3/16$ | $6/32$ | $12/64 = .1875$ | | $20/32$ |
| | $7/32$ | $14/64 = .21875$ | | $40/64 = .625$ |
| $1/4$ | $8/32$ | $16/64 = .25$ | $11/16$ | $21/32$ |
| | $9/32$ | $18/64 = .28125$ | | $42/64 = .65625$ |
| $5/16$ | $10/32$ | $20/64 = .3125$ | | $22/32$ |
| | $11/32$ | $22/64 = .34375$ | $3/4$ | $44/64 = .6875$ |
| $3/8$ | $12/32$ | $24/64 = .375$ | | $23/32$ |
| | $13/32$ | $26/64 = .40625$ | | $46/64 = .71875$ |
| $7/16$ | $14/32$ | $28/64 = .4375$ | | $24/32$ |
| | $15/32$ | $30/64 = .46875$ | $7/8$ | $48/64 = .75$ |
| $1/2$ | $16/32$ | $32/64 = .50$ | | $25/32$ |
| | | | $13/16$ | $50/64 = .78125$ |
| | | | | $26/32$ |
| | | | | $52/64 = .8125$ |
| | | | | $27/32$ |
| | | | | $54/64 = .84375$ |
| | | | | $28/32$ |
| | | | | $56/64 = .875$ |
| | | | | $29/32$ |
| | | | | $58/64 = .90625$ |
| | | | | $30/32$ |
| | | | | $60/64 = .9375$ |
| | | | | $31/32$ |
| | | | | $62/64 = .96875$ |

MISCELLANEOUS CONSTANTS

Mean radius of the earth, 3959 miles = 6371 kilometers.

1 degree of latitude at 40° = 69 miles.

1 nautical mile = 1' of arc on the earth's surface at the equator.

Mean density of the earth, 5.522 grams per cm^3 .

Constant of gravitation, $K = 6.670 \times 10^{-8}$ = the attraction in dynes between two gram masses one centimeter apart.

Acceleration due to gravity at sea level, lat. 45° = 980.616 cm. per sec. per sec. = 32.172 feet per sec. per sec.

Length of seconds pendulum at sea level, lat. 45° = 99.356 cm. = 39.116 in.

Density of mercury at 0°C. = 13.59509 g. per cm^3 .

Density of water, maximum at 3.98°C. = 0.999973 g. per cm^3

Density of dry air at 0°C. and 760 mm. = .001293 g. per cm^3 .

Velocity of sound in dry air at 0°C. , 33,136 cm. per sec. = 1089 feet per sec.

Velocity of light in a vacuum = 2.99796×10^{10} cm. per sec. = 983.571×10^6 feet per sec. = 186,284 mi./sec.

Heat equivalent of fusion of water 79.71 cal. (15°C.) per gram.

Heat equivalent of vaporization of water, 539.55 cal. (15°C.) per gram.

Coefficient of expansion of gases, .003665.

Specific heat of air, at constant pressure, 0.238.

Electrochemical equivalent of silver, 0.001118 g. per sec. per int. ampere.

Mean wave length of sodium light, .00005893 cm. or 5893. ångström units.

Absolute wave length of red cadmium line in air, 760 mm. pressure, 15°C. ; 6438.4696 ångström units.

GREEK ALPHABET

| Greek letter | Greek name | English equivalent | Greek letter | Greek name | English equivalent |
|--------------|------------|--------------------|--------------|------------|--------------------|
| A α | Alpha | a | N ν | Nu | n |
| B β | Beta | b | Ξ ξ | Xi | x |
| Γ γ | Gamma | γ | Ο ο | Omicron | ō |
| Δ δ | Delta | d | Π π | Pi | p |
| E ε | Epsilon | ē | Ρ ρ | Rho | r |
| Z ζ | Zeta | z | Σ σ | Sigma | s |
| H η | Eta | ē | Τ τ | Tau | t |
| Θ θ | Theta | th | Υ υ | Upsilon | u |
| I ι | Iota | i | Φ φ | Phi | ph |
| K κ | Kappa | k | Χ χ | Chi | ch |
| Λ λ | Lambda | l | Ψ ψ | Psi | ps |
| M μ | Mu | m | Ω ω | Omega | ō |

FOUR-PLACE

| N | | | | | | | | | | | Proportional Parts | | | | | | | | | |
|----|------|------|------|------|------|------|------|------|------|------|--------------------|---|----|----|----|----|----|----|----|--|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 10 | 0000 | 0043 | 0086 | 0128 | 0170 | 0212 | 0253 | 0294 | 0334 | 0374 | *4 | 8 | 12 | 17 | 21 | 25 | 29 | 33 | 37 | |
| 11 | 0414 | 0453 | 0492 | 0531 | 0569 | 0607 | 0645 | 0682 | 0719 | 0755 | 4 | 8 | 11 | 15 | 19 | 23 | 26 | 30 | 34 | |
| 12 | 0792 | 0828 | 0864 | 0899 | 0934 | 0969 | 1004 | 1038 | 1072 | 1106 | 3 | 7 | 10 | 14 | 17 | 21 | 24 | 28 | 31 | |
| 13 | 1139 | 1173 | 1206 | 1239 | 1271 | 1303 | 1335 | 1367 | 1399 | 1430 | 3 | 6 | 10 | 13 | 16 | 19 | 23 | 26 | 29 | |
| 14 | 1461 | 1492 | 1523 | 1553 | 1584 | 1614 | 1644 | 1673 | 1703 | 1732 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | |
| 15 | 1761 | 1790 | 1818 | 1847 | 1875 | 1903 | 1931 | 1959 | 1987 | 2014 | *3 | 6 | 8 | 11 | 14 | 17 | 20 | 22 | 25 | |
| 16 | 2041 | 2068 | 2095 | 2122 | 2148 | 2175 | 2201 | 2227 | 2253 | 2279 | 3 | 5 | 8 | 11 | 13 | 16 | 18 | 21 | 24 | |
| 17 | 2304 | 2330 | 2355 | 2380 | 2405 | 2430 | 2455 | 2480 | 2504 | 2529 | 2 | 5 | 7 | 10 | 12 | 15 | 17 | 20 | 22 | |
| 18 | 2553 | 2577 | 2601 | 2625 | 2648 | 2672 | 2695 | 2718 | 2742 | 2765 | 2 | 5 | 7 | 9 | 12 | 14 | 16 | 19 | 21 | |
| 19 | 2788 | 2810 | 2833 | 2856 | 2878 | 2900 | 2923 | 2945 | 2967 | 2989 | 2 | 4 | 7 | 9 | 11 | 13 | 16 | 18 | 20 | |
| 20 | 3010 | 3032 | 3054 | 3075 | 3096 | 3118 | 3139 | 3160 | 3181 | 3201 | 2 | 4 | 6 | 8 | 11 | 13 | 15 | 17 | 19 | |
| 21 | 3222 | 3243 | 3263 | 3284 | 3304 | 3324 | 3345 | 3365 | 3385 | 3404 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | |
| 22 | 3424 | 3444 | 3464 | 3483 | 3502 | 3522 | 3541 | 3560 | 3579 | 3598 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 15 | 17 | |
| 23 | 3617 | 3636 | 3655 | 3674 | 3692 | 3711 | 3729 | 3747 | 3766 | 3784 | 2 | 4 | 6 | 7 | 9 | 11 | 13 | 15 | 17 | |
| 24 | 3802 | 3820 | 3838 | 3856 | 3874 | 3892 | 3909 | 3927 | 3945 | 3962 | 2 | 4 | 5 | 7 | 9 | 11 | 12 | 14 | 16 | |
| 25 | 3979 | 3997 | 4014 | 4031 | 4048 | 4065 | 4082 | 4099 | 4116 | 4133 | 2 | 3 | 5 | 7 | 9 | 10 | 12 | 14 | 15 | |
| 26 | 4150 | 4166 | 4183 | 4200 | 4216 | 4232 | 4249 | 4265 | 4281 | 4298 | 2 | 3 | 5 | 7 | 8 | 10 | 11 | 13 | 15 | |
| 27 | 4314 | 4330 | 4346 | 4362 | 4378 | 4393 | 4409 | 4425 | 4440 | 4456 | 2 | 3 | 5 | 6 | 8 | 9 | 11 | 13 | 14 | |
| 28 | 4472 | 4487 | 4502 | 4518 | 4533 | 4548 | 4564 | 4579 | 4594 | 4609 | 2 | 3 | 5 | 6 | 8 | 9 | 11 | 12 | 14 | |
| 29 | 4624 | 4639 | 4654 | 4669 | 4683 | 4698 | 4713 | 4728 | 4742 | 4757 | 1 | 3 | 4 | 6 | 7 | 9 | 10 | 12 | 13 | |
| 30 | 4771 | 4786 | 4800 | 4814 | 4829 | 4843 | 4857 | 4871 | 4886 | 4900 | 1 | 3 | 4 | 6 | 7 | 9 | 10 | 11 | 13 | |
| 31 | 4914 | 4928 | 4942 | 4955 | 4969 | 4983 | 4997 | 5011 | 5024 | 5038 | 1 | 3 | 4 | 6 | 7 | 8 | 10 | 11 | 12 | |
| 32 | 5051 | 5065 | 5079 | 5092 | 5105 | 5119 | 5132 | 5145 | 5159 | 5172 | 1 | 3 | 4 | 5 | 7 | 8 | 9 | 11 | 12 | |
| 33 | 5185 | 5198 | 5211 | 5224 | 5237 | 5250 | 5263 | 5276 | 5289 | 5302 | 1 | 3 | 4 | 5 | 6 | 8 | 9 | 10 | 12 | |
| 34 | 5315 | 5328 | 5340 | 5353 | 5366 | 5378 | 5391 | 5403 | 5416 | 5428 | 1 | 3 | 4 | 5 | 6 | 8 | 9 | 10 | 11 | |
| 35 | 5441 | 5453 | 5465 | 5478 | 5490 | 5502 | 5514 | 5527 | 5539 | 5551 | 1 | 2 | 4 | 5 | 6 | 7 | 9 | 10 | 11 | |
| 36 | 5563 | 5575 | 5587 | 5599 | 5611 | 5623 | 5635 | 5647 | 5658 | 5670 | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 10 | 11 | |
| 37 | 5682 | 5694 | 5705 | 5717 | 5729 | 5740 | 5752 | 5763 | 5775 | 5786 | 1 | 2 | 3 | 5 | 6 | 7 | 8 | 9 | 10 | |
| 38 | 5798 | 5809 | 5821 | 5832 | 5843 | 5855 | 5866 | 5877 | 5888 | 5899 | 1 | 2 | 3 | 5 | 6 | 7 | 8 | 9 | 10 | |
| 39 | 5911 | 5922 | 5933 | 5944 | 5955 | 5966 | 5977 | 5988 | 5999 | 6010 | 1 | 2 | 3 | 4 | 5 | 7 | 8 | 9 | 10 | |
| 40 | 6021 | 6031 | 6042 | 6053 | 6064 | 6075 | 6085 | 6096 | 6107 | 6117 | 1 | 2 | 3 | 4 | 5 | 6 | 8 | 9 | 10 | |
| 41 | 6128 | 6138 | 6149 | 6160 | 6170 | 6180 | 6191 | 6201 | 6212 | 6222 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 42 | 6232 | 6243 | 6253 | 6263 | 6274 | 6284 | 6294 | 6304 | 6314 | 6325 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 43 | 6335 | 6345 | 6355 | 6365 | 6375 | 6385 | 6395 | 6405 | 6415 | 6425 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 44 | 6435 | 6444 | 6454 | 6464 | 6474 | 6484 | 6493 | 6503 | 6513 | 6522 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 45 | 6532 | 6542 | 6551 | 6561 | 6571 | 6580 | 6590 | 6599 | 6609 | 6618 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 46 | 6628 | 6637 | 6646 | 6656 | 6665 | 6675 | 6684 | 6693 | 6702 | 6712 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 7 | 8 | |
| 47 | 6721 | 6730 | 6739 | 6749 | 6758 | 6767 | 6776 | 6785 | 6794 | 6803 | 1 | 2 | 3 | 4 | 5 | 5 | 6 | 7 | 8 | |
| 48 | 6812 | 6821 | 6830 | 6839 | 6848 | 6857 | 6866 | 6875 | 6884 | 6893 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 7 | 8 | |
| 49 | 6902 | 6911 | 6920 | 6928 | 6937 | 6946 | 6955 | 6964 | 6972 | 6981 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 7 | 8 | |
| 50 | 6990 | 6998 | 7007 | 7016 | 7024 | 7033 | 7042 | 7050 | 7059 | 7067 | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 7 | 8 | |
| 51 | 7076 | 7084 | 7093 | 7101 | 7110 | 7118 | 7126 | 7135 | 7143 | 7152 | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 7 | 8 | |
| 52 | 7160 | 7168 | 7177 | 7185 | 7193 | 7202 | 7210 | 7218 | 7226 | 7235 | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 7 | 7 | |
| 53 | 7243 | 7251 | 7259 | 7267 | 7275 | 7284 | 7292 | 7300 | 7308 | 7316 | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 6 | 7 | |
| 54 | 7324 | 7332 | 7340 | 7348 | 7356 | 7364 | 7372 | 7380 | 7388 | 7396 | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 6 | 7 | |
| N | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |

* Interpolation in this section of the table is inaccurate.

LOGARITHMS

| N | | | | | | | | | | | Proportional Parts | | | | | | | | | |
|----|------|------|------|------|------|------|------|------|------|------|--------------------|---|---|---|---|---|---|---|---|--|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 55 | 7404 | 7412 | 7419 | 7427 | 7435 | 7443 | 7451 | 7459 | 7466 | 7474 | 1 | 2 | 2 | 3 | 4 | 5 | 5 | 6 | 7 | |
| 56 | 7482 | 7490 | 7497 | 7505 | 7513 | 7520 | 7528 | 7536 | 7543 | 7551 | 1 | 2 | 2 | 3 | 4 | 5 | 5 | 6 | 7 | |
| 57 | 7559 | 7566 | 7574 | 7582 | 7589 | 7597 | 7604 | 7612 | 7619 | 7627 | 1 | 2 | 2 | 3 | 4 | 5 | 5 | 6 | 7 | |
| 58 | 7634 | 7642 | 7649 | 7657 | 7664 | 7672 | 7679 | 7686 | 7694 | 7701 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 7 | |
| 59 | 7709 | 7716 | 7723 | 7731 | 7738 | 7745 | 7752 | 7760 | 7767 | 7774 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 7 | |
| 60 | 7782 | 7789 | 7796 | 7803 | 7810 | 7818 | 7825 | 7832 | 7839 | 7846 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 6 | |
| 61 | 7853 | 7860 | 7868 | 7875 | 7882 | 7889 | 7896 | 7903 | 7910 | 7917 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 6 | |
| 62 | 7924 | 7931 | 7938 | 7945 | 7952 | 7959 | 7966 | 7973 | 7980 | 7987 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 6 | |
| 63 | 7993 | 8000 | 8007 | 8014 | 8021 | 8028 | 8035 | 8041 | 8048 | 8055 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 | |
| 64 | 8062 | 8069 | 8075 | 8082 | 8089 | 8096 | 8102 | 8109 | 8116 | 8122 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 | |
| 65 | 8129 | 8136 | 8142 | 8149 | 8156 | 8162 | 8169 | 8176 | 8182 | 8189 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 | |
| 66 | 8195 | 8202 | 8209 | 8215 | 8222 | 8228 | 8235 | 8241 | 8248 | 8254 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 | |
| 67 | 8261 | 8267 | 8274 | 8280 | 8287 | 8293 | 8299 | 8306 | 8312 | 8319 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 | |
| 68 | 8325 | 8331 | 8338 | 8344 | 8351 | 8357 | 8363 | 8370 | 8376 | 8382 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 5 | 6 | |
| 69 | 8388 | 8395 | 8401 | 8407 | 8414 | 8420 | 8426 | 8432 | 8439 | 8445 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 6 | |
| 70 | 8451 | 8457 | 8463 | 8470 | 8476 | 8482 | 8488 | 8494 | 8500 | 8506 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 6 | |
| 71 | 8513 | 8519 | 8525 | 8531 | 8537 | 8543 | 8549 | 8555 | 8561 | 8567 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 5 | |
| 72 | 8573 | 8579 | 8585 | 8591 | 8597 | 8603 | 8609 | 8615 | 8621 | 8627 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 5 | |
| 73 | 8633 | 8639 | 8645 | 8651 | 8657 | 8663 | 8669 | 8675 | 8681 | 8686 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 5 | |
| 74 | 8692 | 8698 | 8704 | 8710 | 8716 | 8722 | 8727 | 8733 | 8739 | 8745 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 5 | |
| 75 | 8751 | 8756 | 8762 | 8768 | 8774 | 8779 | 8785 | 8791 | 8797 | 8802 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 5 | 5 | |
| 76 | 8808 | 8814 | 8820 | 8825 | 8831 | 8837 | 8842 | 8848 | 8854 | 8859 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 5 | 5 | |
| 77 | 8865 | 8871 | 8876 | 8882 | 8887 | 8893 | 8899 | 8904 | 8910 | 8915 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | |
| 78 | 8921 | 8927 | 8932 | 8938 | 8943 | 8949 | 8954 | 8960 | 8965 | 8971 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | |
| 79 | 8976 | 8982 | 8987 | 8993 | 8998 | 9004 | 9009 | 9015 | 9020 | 9025 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | |
| 80 | 9031 | 9036 | 9042 | 9047 | 9053 | 9058 | 9063 | 9069 | 9074 | 9079 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | |
| 81 | 9085 | 9090 | 9096 | 9101 | 9106 | 9112 | 9117 | 9122 | 9128 | 9133 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | |
| 82 | 9138 | 9143 | 9149 | 9154 | 9159 | 9165 | 9170 | 9175 | 9180 | 9186 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | |
| 83 | 9191 | 9196 | 9201 | 9206 | 9212 | 9217 | 9222 | 9227 | 9232 | 9238 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | |
| 84 | 9243 | 9248 | 9253 | 9258 | 9263 | 9269 | 9274 | 9279 | 9284 | 9289 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | |
| 85 | 9294 | 9299 | 9304 | 9309 | 9315 | 9320 | 9325 | 9330 | 9335 | 9340 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | |
| 86 | 9345 | 9350 | 9355 | 9360 | 9365 | 9370 | 9375 | 9380 | 9385 | 9390 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | |
| 87 | 9395 | 9400 | 9405 | 9410 | 9415 | 9420 | 9425 | 9430 | 9435 | 9440 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | |
| 88 | 9445 | 9450 | 9455 | 9460 | 9465 | 9469 | 9474 | 9479 | 9484 | 9489 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | |
| 89 | 9494 | 9499 | 9504 | 9509 | 9513 | 9518 | 9523 | 9528 | 9533 | 9538 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | |
| 90 | 9542 | 9547 | 9552 | 9557 | 9562 | 9566 | 9571 | 9576 | 9581 | 9586 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | |
| 91 | 9590 | 9595 | 9600 | 9605 | 9609 | 9614 | 9619 | 9624 | 9628 | 9633 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | |
| 92 | 9638 | 9643 | 9647 | 9652 | 9657 | 9661 | 9666 | 9671 | 9675 | 9680 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | |
| 93 | 9685 | 9689 | 9694 | 9699 | 9703 | 9708 | 9713 | 9717 | 9722 | 9727 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | |
| 94 | 9731 | 9736 | 9741 | 9745 | 9750 | 9754 | 9759 | 9763 | 9768 | 9773 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | |
| 95 | 9777 | 9782 | 9786 | 9791 | 9795 | 9800 | 9805 | 9809 | 9814 | 9818 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | |
| 96 | 9823 | 9827 | 9832 | 9836 | 9841 | 9845 | 9850 | 9854 | 9859 | 9863 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | |
| 97 | 9868 | 9872 | 9877 | 9881 | 9886 | 9890 | 9894 | 9899 | 9903 | 9908 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | |
| 98 | 9912 | 9917 | 9921 | 9926 | 9930 | 9934 | 9939 | 9943 | 9948 | 9952 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | |
| 99 | 9956 | 9961 | 9965 | 9969 | 9974 | 9978 | 9983 | 9987 | 9991 | 9996 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | |
| N | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |

ANTILOGARITHMS

| | 0 1 2 3 4 | | | | | 5 6 7 8 9 | | | | | Proportional Parts 1 2 3 4 5 6 7 8 9 | | | | | | | | | |
|-----|-----------|------|------|------|------|-----------|------|------|------|------|---|---|---|---|---|---|---|---|---|--|
| .00 | 1000 | 1002 | 1005 | 1007 | 1009 | 1012 | 1014 | 1016 | 1019 | 1021 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | |
| .01 | 1023 | 1026 | 1028 | 1030 | 1033 | 1035 | 1038 | 1040 | 1042 | 1045 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | |
| .02 | 1047 | 1050 | 1052 | 1054 | 1057 | 1059 | 1062 | 1064 | 1067 | 1069 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | |
| .03 | 1072 | 1074 | 1076 | 1079 | 1081 | 1084 | 1086 | 1089 | 1091 | 1094 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | |
| .04 | 1096 | 1099 | 1102 | 1104 | 1107 | 1109 | 1112 | 1114 | 1117 | 1119 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | |
| .05 | 1122 | 1125 | 1127 | 1130 | 1132 | 1135 | 1138 | 1140 | 1143 | 1146 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | |
| .06 | 1148 | 1151 | 1153 | 1156 | 1159 | 1161 | 1164 | 1167 | 1169 | 1172 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | |
| .07 | 1175 | 1178 | 1180 | 1183 | 1186 | 1189 | 1191 | 1194 | 1197 | 1199 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | |
| .08 | 1202 | 1205 | 1208 | 1211 | 1213 | 1216 | 1219 | 1222 | 1225 | 1227 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | |
| .09 | 1230 | 1233 | 1236 | 1239 | 1242 | 1245 | 1247 | 1250 | 1253 | 1256 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | |
| .10 | 1259 | 1262 | 1265 | 1268 | 1271 | 1274 | 1276 | 1279 | 1282 | 1285 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | |
| .11 | 1288 | 1291 | 1294 | 1297 | 1300 | 1303 | 1306 | 1309 | 1312 | 1315 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | |
| .12 | 1318 | 1321 | 1324 | 1327 | 1330 | 1334 | 1337 | 1340 | 1343 | 1346 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | |
| .13 | 1349 | 1352 | 1355 | 1358 | 1361 | 1365 | 1368 | 1371 | 1374 | 1377 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | |
| .14 | 1380 | 1384 | 1387 | 1390 | 1393 | 1396 | 1400 | 1403 | 1406 | 1409 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | |
| .15 | 1413 | 1416 | 1419 | 1422 | 1426 | 1429 | 1432 | 1435 | 1439 | 1442 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | |
| .16 | 1445 | 1449 | 1452 | 1455 | 1459 | 1462 | 1466 | 1469 | 1472 | 1476 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | |
| .17 | 1479 | 1483 | 1486 | 1489 | 1493 | 1496 | 1500 | 1503 | 1507 | 1510 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | |
| .18 | 1514 | 1517 | 1521 | 1524 | 1528 | 1531 | 1535 | 1538 | 1542 | 1545 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | |
| .19 | 1549 | 1552 | 1556 | 1560 | 1563 | 1567 | 1570 | 1574 | 1578 | 1581 | 0 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | |
| .20 | 1585 | 1589 | 1592 | 1596 | 1600 | 1603 | 1607 | 1611 | 1614 | 1618 | 0 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | |
| .21 | 1622 | 1626 | 1629 | 1633 | 1637 | 1641 | 1644 | 1648 | 1652 | 1656 | 0 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | |
| .22 | 1660 | 1663 | 1667 | 1671 | 1675 | 1679 | 1683 | 1687 | 1690 | 1694 | 0 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | |
| .23 | 1698 | 1702 | 1706 | 1710 | 1714 | 1718 | 1722 | 1726 | 1730 | 1734 | 0 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 4 | |
| .24 | 1738 | 1742 | 1746 | 1750 | 1754 | 1758 | 1762 | 1766 | 1770 | 1774 | 0 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 4 | |
| .25 | 1778 | 1782 | 1786 | 1791 | 1795 | 1799 | 1803 | 1807 | 1811 | 1816 | 0 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 4 | |
| .26 | 1820 | 1824 | 1828 | 1832 | 1837 | 1841 | 1845 | 1849 | 1854 | 1858 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 4 | |
| .27 | 1862 | 1866 | 1871 | 1875 | 1879 | 1884 | 1888 | 1892 | 1897 | 1901 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 4 | |
| .28 | 1905 | 1910 | 1914 | 1919 | 1923 | 1928 | 1932 | 1936 | 1941 | 1945 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | |
| .29 | 1950 | 1954 | 1959 | 1963 | 1968 | 1972 | 1977 | 1982 | 1986 | 1991 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | |
| .30 | 1995 | 2000 | 2004 | 2009 | 2014 | 2018 | 2023 | 2028 | 2032 | 2037 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | |
| .31 | 2042 | 2046 | 2051 | 2056 | 2061 | 2065 | 2070 | 2075 | 2080 | 2084 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | |
| .32 | 2089 | 2094 | 2099 | 2104 | 2109 | 2113 | 2118 | 2123 | 2128 | 2133 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | |
| .33 | 2138 | 2143 | 2148 | 2153 | 2158 | 2163 | 2168 | 2173 | 2178 | 2183 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | |
| .34 | 2188 | 2193 | 2198 | 2203 | 2208 | 2213 | 2218 | 2223 | 2228 | 2234 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | |
| .35 | 2239 | 2244 | 2249 | 2254 | 2259 | 2265 | 2270 | 2275 | 2280 | 2286 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | |
| .36 | 2291 | 2296 | 2301 | 2307 | 2312 | 2317 | 2323 | 2328 | 2333 | 2339 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | |
| .37 | 2344 | 2350 | 2355 | 2360 | 2366 | 2371 | 2377 | 2382 | 2388 | 2393 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | |
| .38 | 2399 | 2404 | 2410 | 2415 | 2421 | 2427 | 2432 | 2438 | 2443 | 2449 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | |
| .39 | 2455 | 2460 | 2466 | 2472 | 2477 | 2483 | 2489 | 2495 | 2500 | 2506 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 5 | 5 | |
| .40 | 2512 | 2518 | 2523 | 2529 | 2535 | 2541 | 2547 | 2553 | 2559 | 2564 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 5 | |
| .41 | 2570 | 2576 | 2582 | 2588 | 2594 | 2600 | 2606 | 2612 | 2618 | 2624 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 5 | |
| .42 | 2630 | 2636 | 2642 | 2649 | 2655 | 2661 | 2667 | 2673 | 2679 | 2685 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 6 | |
| .43 | 2692 | 2698 | 2704 | 2710 | 2716 | 2723 | 2729 | 2735 | 2742 | 2748 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 5 | 6 | |
| .44 | 2754 | 2761 | 2767 | 2773 | 2780 | 2786 | 2793 | 2799 | 2805 | 2812 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 5 | 6 | |
| .45 | 2818 | 2825 | 2831 | 2838 | 2844 | 2851 | 2858 | 2864 | 2871 | 2877 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 | |
| .46 | 2884 | 2891 | 2897 | 2904 | 2911 | 2917 | 2924 | 2931 | 2938 | 2944 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 | |
| .47 | 2951 | 2958 | 2965 | 2972 | 2979 | 2985 | 2992 | 2999 | 3006 | 3013 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 | |
| .48 | 3020 | 3027 | 3034 | 3041 | 3048 | 3055 | 3062 | 3069 | 3076 | 3083 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 6 | |
| .49 | 3090 | 3097 | 3105 | 3112 | 3119 | 3126 | 3133 | 3141 | 3148 | 3155 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 6 | |
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |

ANTILOGARITHMS

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional Parts | | | | | | | | |
|-----|------|------|------|------|------|------|------|------|------|------|--------------------|---|---|---|----|----|----|----|----|
| | | | | | | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| .50 | 3162 | 3170 | 3177 | 3184 | 3192 | 3199 | 3206 | 3214 | 3221 | 3228 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 7 |
| .51 | 3236 | 3243 | 3251 | 3258 | 3266 | 3273 | 3281 | 3289 | 3296 | 3304 | 1 | 2 | 2 | 3 | 4 | 5 | 5 | 6 | 7 |
| .52 | 3311 | 3319 | 3327 | 3334 | 3342 | 3350 | 3357 | 3365 | 3373 | 3381 | 1 | 2 | 2 | 3 | 4 | 5 | 5 | 6 | 7 |
| .53 | 3388 | 3396 | 3404 | 3412 | 3420 | 3428 | 3436 | 3443 | 3451 | 3459 | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 6 | 7 |
| .54 | 3467 | 3475 | 3483 | 3491 | 3499 | 3508 | 3516 | 3524 | 3532 | 3540 | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 6 | 7 |
| .55 | 3548 | 3556 | 3565 | 3573 | 3581 | 3589 | 3597 | 3606 | 3614 | 3622 | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 7 | 7 |
| .56 | 3631 | 3639 | 3648 | 3656 | 3664 | 3673 | 3681 | 3690 | 3698 | 3707 | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 7 | 8 |
| .57 | 3715 | 3724 | 3733 | 3741 | 3750 | 3758 | 3767 | 3776 | 3784 | 3793 | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 7 | 8 |
| .58 | 3802 | 3811 | 3819 | 3828 | 3837 | 3846 | 3855 | 3864 | 3873 | 3882 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 7 | 8 |
| .59 | 3890 | 3899 | 3908 | 3917 | 3926 | 3936 | 3945 | 3954 | 3963 | 3972 | 1 | 2 | 3 | 4 | 5 | 5 | 6 | 7 | 8 |
| .60 | 3981 | 3990 | 3999 | 4009 | 4018 | 4027 | 4036 | 4046 | 4055 | 4064 | 1 | 2 | 3 | 4 | 5 | 6 | 6 | 7 | 8 |
| .61 | 4074 | 4083 | 4093 | 4102 | 4111 | 4121 | 4130 | 4140 | 4150 | 4159 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| .62 | 4169 | 4178 | 4188 | 4198 | 4207 | 4217 | 4227 | 4236 | 4246 | 4256 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| .63 | 4266 | 4276 | 4285 | 4295 | 4305 | 4315 | 4325 | 4335 | 4345 | 4355 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| .64 | 4365 | 4375 | 4385 | 4395 | 4406 | 4416 | 4426 | 4436 | 4446 | 4457 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| .65 | 4467 | 4477 | 4487 | 4498 | 4508 | 4519 | 4529 | 4539 | 4550 | 4560 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| .66 | 4571 | 4581 | 4592 | 4603 | 4613 | 4624 | 4634 | 4645 | 4656 | 4667 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 9 | 10 |
| .67 | 4677 | 4688 | 4699 | 4710 | 4721 | 4732 | 4742 | 4753 | 4764 | 4775 | 1 | 2 | 3 | 4 | 5 | 7 | 8 | 9 | 10 |
| .68 | 4786 | 4797 | 4808 | 4819 | 4831 | 4842 | 4853 | 4864 | 4875 | 4887 | 1 | 2 | 3 | 4 | 6 | 7 | 8 | 9 | 10 |
| .69 | 4898 | 4909 | 4920 | 4932 | 4943 | 4955 | 4966 | 4977 | 4989 | 5000 | 1 | 2 | 3 | 5 | 6 | 7 | 8 | 9 | 10 |
| .70 | 5012 | 5023 | 5035 | 5047 | 5058 | 5070 | 5082 | 5093 | 5105 | 5117 | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 9 | 11 |
| .71 | 5129 | 5140 | 5152 | 5164 | 5176 | 5188 | 5200 | 5212 | 5224 | 5236 | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 10 | 11 |
| .72 | 5248 | 5260 | 5272 | 5284 | 5297 | 5309 | 5321 | 5333 | 5346 | 5358 | 1 | 2 | 4 | 5 | 6 | 7 | 9 | 10 | 11 |
| .73 | 5370 | 5383 | 5395 | 5408 | 5420 | 5433 | 5445 | 5458 | 5470 | 5483 | 1 | 3 | 4 | 5 | 6 | 8 | 9 | 10 | 11 |
| .74 | 5495 | 5508 | 5521 | 5534 | 5546 | 5559 | 5572 | 5585 | 5598 | 5610 | 1 | 3 | 4 | 5 | 6 | 8 | 9 | 10 | 12 |
| .75 | 5623 | 5636 | 5649 | 5662 | 5675 | 5689 | 5702 | 5715 | 5728 | 5741 | 1 | 3 | 4 | 5 | 7 | 8 | 9 | 10 | 12 |
| .76 | 5754 | 5768 | 5781 | 5794 | 5808 | 5821 | 5834 | 5848 | 5861 | 5875 | 1 | 3 | 4 | 5 | 7 | 8 | 9 | 11 | 12 |
| .77 | 5888 | 5902 | 5916 | 5929 | 5943 | 5957 | 5970 | 5984 | 5998 | 6012 | 1 | 3 | 4 | 5 | 7 | 8 | 10 | 11 | 12 |
| .78 | 6026 | 6039 | 6053 | 6067 | 6081 | 6095 | 6109 | 6124 | 6138 | 6152 | 1 | 3 | 4 | 6 | 7 | 8 | 10 | 11 | 13 |
| .79 | 6166 | 6180 | 6194 | 6209 | 6223 | 6237 | 6252 | 6266 | 6281 | 6295 | 1 | 3 | 4 | 6 | 7 | 9 | 10 | 11 | 13 |
| .80 | 6310 | 6324 | 6339 | 6353 | 6368 | 6383 | 6397 | 6412 | 6427 | 6442 | 2 | 3 | 4 | 6 | 7 | 9 | 10 | 12 | 13 |
| .81 | 6457 | 6471 | 6486 | 6501 | 6516 | 6531 | 6546 | 6561 | 6577 | 6592 | 2 | 3 | 5 | 6 | 8 | 9 | 11 | 12 | 14 |
| .82 | 6607 | 6622 | 6637 | 6653 | 6668 | 6683 | 6699 | 6714 | 6730 | 6745 | 2 | 3 | 5 | 6 | 8 | 9 | 11 | 12 | 14 |
| .83 | 6761 | 6776 | 6792 | 6808 | 6823 | 6839 | 6855 | 6871 | 6887 | 6902 | 2 | 3 | 5 | 6 | 8 | 9 | 11 | 13 | 14 |
| .84 | 6918 | 6934 | 6950 | 6966 | 6982 | 6998 | 7015 | 7031 | 7047 | 7063 | 2 | 3 | 5 | 6 | 8 | 10 | 11 | 13 | 15 |
| .85 | 7079 | 7096 | 7112 | 7129 | 7145 | 7161 | 7178 | 7194 | 7211 | 7228 | 2 | 3 | 5 | 7 | 8 | 10 | 12 | 13 | 15 |
| .86 | 7244 | 7261 | 7278 | 7295 | 7311 | 7328 | 7345 | 7362 | 7379 | 7396 | 2 | 3 | 5 | 7 | 8 | 10 | 12 | 13 | 15 |
| .87 | 7413 | 7430 | 7447 | 7464 | 7482 | 7499 | 7516 | 7534 | 7551 | 7568 | 2 | 3 | 5 | 7 | 9 | 10 | 12 | 14 | 16 |
| .88 | 7586 | 7603 | 7621 | 7638 | 7656 | 7674 | 7691 | 7709 | 7727 | 7745 | 2 | 4 | 5 | 7 | 9 | 11 | 12 | 14 | 16 |
| .89 | 7762 | 7780 | 7798 | 7816 | 7834 | 7852 | 7870 | 7889 | 7907 | 7925 | 2 | 4 | 5 | 7 | 9 | 11 | 13 | 14 | 16 |
| .90 | 7943 | 7962 | 7980 | 7998 | 8017 | 8035 | 8054 | 8072 | 8091 | 8110 | 2 | 4 | 6 | 7 | 9 | 11 | 13 | 15 | 17 |
| .91 | 8128 | 8147 | 8166 | 8185 | 8204 | 8222 | 8241 | 8260 | 8279 | 8299 | 2 | 4 | 6 | 8 | 9 | 11 | 13 | 15 | 17 |
| .92 | 8318 | 8337 | 8356 | 8375 | 8395 | 8414 | 8433 | 8453 | 8472 | 8492 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 15 | 17 |
| .93 | 8511 | 8531 | 8551 | 8570 | 8590 | 8610 | 8630 | 8650 | 8670 | 8690 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |
| .94 | 8710 | 8730 | 8750 | 8770 | 8790 | 8810 | 8831 | 8851 | 8872 | 8892 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |
| .95 | 8913 | 8933 | 8954 | 8974 | 8995 | 9016 | 9036 | 9057 | 9078 | 9099 | 2 | 4 | 6 | 8 | 10 | 12 | 15 | 17 | 19 |
| .96 | 9120 | 9141 | 9162 | 9183 | 9204 | 9226 | 9247 | 9268 | 9290 | 9311 | 2 | 4 | 6 | 8 | 11 | 13 | 15 | 17 | 19 |
| .97 | 9333 | 9354 | 9376 | 9397 | 9419 | 9441 | 9462 | 9484 | 9506 | 9528 | 2 | 4 | 7 | 9 | 11 | 13 | 15 | 17 | 20 |
| .98 | 9550 | 9572 | 9594 | 9616 | 9638 | 9661 | 9683 | 9705 | 9727 | 9750 | 2 | 4 | 7 | 9 | 11 | 13 | 16 | 18 | 20 |
| .99 | 9772 | 9795 | 9817 | 9840 | 9863 | 9886 | 9908 | 9931 | 9954 | 9977 | 2 | 5 | 7 | 9 | 11 | 14 | 16 | 18 | 20 |
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

FIVE-PLACE LOGARITHMS

| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |
|-----|----|-----|------|------|------|------|------|------|------|------|--------------------|------------------|
| 100 | 00 | 000 | 043 | 087 | 130 | 173 | 217 | 260 | 303 | 346 | 389 | 44 43 42 |
| 101 | | 432 | 475 | 518 | 561 | 604 | 647 | 689 | 732 | 775 | 817 | 1 4,4 4,3 4,2 |
| 102 | | 860 | 903 | 945 | 988 | *030 | *072 | *115 | *157 | *199 | *242 | 2 8,8 8,6 8,4 |
| 103 | 01 | 284 | 326 | 368 | 410 | 452 | 494 | 536 | 578 | 620 | 662 | 3 13,2 12,9 12,6 |
| 104 | | 703 | 745 | 787 | 828 | 870 | 912 | 953 | 995 | *036 | *078 | 4 17,6 17,2 16,8 |
| 105 | 02 | 119 | 160 | 202 | 243 | 284 | 325 | 366 | 407 | 449 | 490 | 5 22,0 21,5 21,0 |
| 106 | | 531 | 572 | 612 | 653 | 694 | 735 | 776 | 816 | 857 | 898 | 6 26,4 25,8 25,2 |
| 107 | | 938 | 979 | *019 | *060 | *100 | *141 | *181 | *222 | *262 | *302 | 7 30,8 30,1 29,4 |
| 108 | 03 | 342 | 383 | 423 | 463 | 503 | 543 | 583 | 623 | 663 | 703 | 8 35,2 34,4 33,6 |
| 109 | | 743 | 782 | 822 | 862 | 902 | 941 | 981 | *021 | *060 | *100 | 9 39,6 38,7 37,8 |
| 110 | 04 | 139 | 179 | 218 | 258 | 297 | 336 | 376 | 415 | 454 | 493 | 41 40 39 |
| 111 | | 532 | 571 | 610 | 650 | 689 | 727 | 766 | 805 | 844 | 883 | 1 4,1 4,0 3,9 |
| 112 | | 922 | 961 | 999 | *038 | *077 | *115 | *154 | *192 | *231 | *269 | 2 8,2 8,0 7,8 |
| 113 | 05 | 308 | 346 | 385 | 423 | 461 | 500 | 538 | 576 | 614 | 652 | 3 12,3 12,0 11,7 |
| 114 | | 690 | 729 | 767 | 805 | 843 | 881 | 918 | 956 | 994 | *032 | 4 16,4 16,0 15,6 |
| 115 | 06 | 070 | 108 | 145 | 183 | 221 | 258 | 296 | 333 | 371 | 408 | 5 20,5 20,0 19,5 |
| 116 | | 446 | 483 | 521 | 558 | 595 | 633 | 670 | 707 | 744 | 781 | 6 24,6 24,0 23,4 |
| 117 | | 819 | 856 | 893 | 930 | 967 | *004 | *041 | *078 | *115 | *151 | 7 28,7 28,0 27,3 |
| 118 | 07 | 188 | 225 | 262 | 298 | 335 | 372 | 408 | 445 | 482 | 518 | 8 32,8 32,0 31,2 |
| 119 | | 555 | 591 | 628 | 664 | 700 | 737 | 773 | 809 | 846 | 882 | 9 36,9 36,0 35,1 |
| 120 | | 918 | 954 | 990 | *027 | *063 | *099 | *135 | *171 | *207 | *243 | 38 37 36 |
| 121 | 08 | 279 | 314 | 350 | 386 | 422 | 458 | 493 | 529 | 565 | 600 | 1 3,8 3,7 3,6 |
| 122 | | 636 | 672 | 707 | 743 | 778 | 814 | 849 | 884 | 920 | 955 | 2 7,6 7,4 7,2 |
| 123 | | 991 | *026 | *061 | *096 | *132 | *167 | *202 | *237 | *272 | *307 | 3 11,4 11,1 10,8 |
| 124 | 09 | 342 | 377 | 412 | 447 | 482 | 517 | 552 | 587 | 621 | 656 | 4 15,2 14,8 14,4 |
| 125 | | 691 | 726 | 760 | 795 | 830 | 864 | 899 | 934 | 968 | *003 | 5 19,0 18,5 18,0 |
| 126 | 10 | 037 | 072 | 106 | 140 | 175 | 209 | 243 | 278 | 312 | 346 | 6 22,8 22,2 21,6 |
| 127 | | 380 | 415 | 449 | 483 | 517 | 551 | 585 | 619 | 653 | 687 | 7 26,6 25,9 25,2 |
| 128 | | 721 | 755 | 789 | 823 | 857 | 890 | 924 | 958 | 992 | *025 | 8 30,4 29,6 28,8 |
| 129 | 11 | 059 | 093 | 126 | 160 | 193 | 227 | 261 | 294 | 327 | 361 | 9 34,2 33,3 32,4 |
| 130 | | 394 | 428 | 461 | 494 | 528 | 561 | 594 | 628 | 661 | 694 | 35 34 33 |
| 131 | | 727 | 760 | 793 | 826 | 860 | 893 | 926 | 959 | 992 | *024 | 1 3,5 3,4 3,3 |
| 132 | 12 | 057 | 090 | 123 | 156 | 189 | 222 | 254 | 287 | 320 | 352 | 2 7,0 6,8 6,6 |
| 133 | | 385 | 418 | 450 | 483 | 516 | 548 | 581 | 613 | 646 | 678 | 3 10,5 10,2 9,9 |
| 134 | | 710 | 743 | 775 | 808 | 840 | 872 | 905 | 937 | 969 | *001 | 4 14,0 13,6 13,2 |
| 135 | 13 | 033 | 066 | 098 | 130 | 162 | 194 | 226 | 258 | 290 | 322 | 5 17,5 17,0 16,5 |
| 136 | | 354 | 386 | 418 | 450 | 481 | 513 | 545 | 577 | 609 | 640 | 6 21,0 20,4 19,8 |
| 137 | | 672 | 704 | 735 | 767 | 799 | 830 | 862 | 893 | 925 | 956 | 7 24,5 23,8 23,1 |
| 138 | | 988 | *019 | *051 | *082 | *114 | *145 | *176 | *208 | *239 | *270 | 8 28,0 27,2 26,4 |
| 139 | 14 | 301 | 333 | 364 | 395 | 426 | 457 | 489 | 520 | 551 | 582 | 9 31,5 30,6 29,7 |
| 140 | | 613 | 644 | 675 | 706 | 737 | 768 | 799 | 829 | 860 | 891 | 32 31 30 |
| 141 | | 922 | 953 | 983 | *014 | *045 | *076 | *106 | *137 | *168 | *198 | 1 3,2 3,1 3,0 |
| 142 | 15 | 229 | 259 | 290 | 320 | 351 | 381 | 412 | 442 | 473 | 503 | 2 6,4 6,2 6,0 |
| 143 | | 534 | 564 | 594 | 625 | 655 | 685 | 715 | 746 | 776 | 806 | 3 9,6 9,3 9,0 |
| 144 | | 836 | 866 | 897 | 927 | 957 | 987 | *017 | *047 | *077 | *107 | 4 12,8 12,4 12,0 |
| 145 | 16 | 137 | 167 | 197 | 227 | 256 | 286 | 316 | 346 | 376 | 406 | 5 16,0 15,5 15,0 |
| 146 | | 435 | 465 | 495 | 524 | 554 | 584 | 613 | 643 | 673 | 702 | 6 19,2 18,6 18,0 |
| 147 | | 732 | 761 | 791 | 820 | 850 | 879 | 909 | 938 | 967 | 997 | 7 22,4 21,7 21,0 |
| 148 | 17 | 026 | 056 | 085 | 114 | 143 | 173 | 202 | 231 | 260 | 289 | 8 25,6 24,8 24,0 |
| 149 | | 319 | 348 | 377 | 406 | 435 | 464 | 493 | 522 | 551 | 580 | 9 28,8 27,9 27,0 |
| 150 | | 609 | 638 | 667 | 696 | 725 | 754 | 782 | 811 | 840 | 869 | |
| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |

FIVE-PLACE LOGARITHMS (Continued)

| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | | | |
|-----|----|-----|-----|------|------|------|------|------|------|------|--------------------|----|------|------|
| 150 | 17 | 609 | 638 | 667 | 696 | 725 | 754 | 782 | 811 | 840 | 869 | 29 | 28 | |
| 151 | | 898 | 926 | 955 | 984 | *013 | *041 | *070 | *099 | *127 | *156 | 1 | 2,9 | 2,8 |
| 152 | 18 | 184 | 213 | 241 | 270 | 298 | 327 | 355 | 384 | 412 | 441 | 2 | 5,8 | 5,6 |
| 153 | | 469 | 498 | 526 | 554 | 583 | 611 | 639 | 667 | 696 | 724 | 3 | 8,7 | 8,4 |
| 154 | | 752 | 780 | 808 | 837 | 865 | 893 | 921 | 949 | 977 | *005 | 4 | 11,6 | 11,2 |
| 155 | 19 | 033 | 061 | 089 | 117 | 145 | 173 | 201 | 229 | 257 | 285 | 5 | 14,5 | 14,0 |
| 156 | | 312 | 340 | 368 | 396 | 424 | 451 | 479 | 507 | 535 | 562 | 6 | 17,4 | 16,8 |
| 157 | | 590 | 618 | 645 | 673 | 700 | 728 | 756 | 783 | 811 | 838 | 7 | 20,3 | 19,6 |
| 158 | | 866 | 893 | 921 | 948 | 976 | *003 | *030 | *058 | *085 | *112 | 8 | 23,2 | 22,4 |
| 159 | 20 | 140 | 167 | 194 | 222 | 249 | 276 | 303 | 330 | 358 | 385 | 9 | 26,1 | 25,2 |
| 160 | | 412 | 439 | 466 | 493 | 520 | 548 | 575 | 602 | 629 | 656 | 27 | 26 | |
| 161 | | 683 | 710 | 737 | 763 | 790 | 817 | 844 | 871 | 898 | 925 | 1 | 2,7 | 2,6 |
| 162 | | 952 | 978 | *005 | *032 | *059 | *085 | *112 | *139 | *165 | *192 | 2 | 5,4 | 5,2 |
| 163 | 21 | 219 | 245 | 272 | 299 | 325 | 352 | 378 | 405 | 431 | 458 | 3 | 8,1 | 7,8 |
| 164 | | 484 | 511 | 537 | 564 | 590 | 617 | 643 | 669 | 696 | 722 | 4 | 10,8 | 10,4 |
| 165 | | 748 | 775 | 801 | 827 | 854 | 880 | 906 | 932 | 958 | 985 | 5 | 13,5 | 13,0 |
| 166 | 22 | 011 | 037 | 063 | 089 | 115 | 141 | 167 | 194 | 220 | 246 | 6 | 16,2 | 15,6 |
| 167 | | 272 | 298 | 324 | 350 | 376 | 401 | 427 | 453 | 479 | 505 | 7 | 18,9 | 18,2 |
| 168 | | 531 | 557 | 583 | 608 | 634 | 660 | 686 | 712 | 737 | 763 | 8 | 21,6 | 20,8 |
| 169 | | 789 | 814 | 840 | 866 | 891 | 917 | 943 | 968 | 994 | *019 | 9 | 24,3 | 23,4 |
| 170 | 23 | 045 | 070 | 096 | 121 | 147 | 172 | 198 | 223 | 249 | 274 | 25 | | |
| 171 | | 300 | 325 | 350 | 376 | 401 | 426 | 452 | 477 | 502 | 528 | 1 | 2,5 | |
| 172 | | 553 | 578 | 603 | 629 | 654 | 679 | 704 | 729 | 754 | 779 | 2 | 5,0 | |
| 173 | | 805 | 830 | 855 | 880 | 905 | 930 | 955 | 980 | *005 | *030 | 3 | 7,5 | |
| 174 | 24 | 055 | 080 | 105 | 130 | 155 | 180 | 204 | 229 | 254 | 279 | 4 | 10,0 | |
| 175 | | 304 | 329 | 353 | 378 | 403 | 428 | 452 | 477 | 502 | 527 | 5 | 12,5 | |
| 176 | | 551 | 576 | 601 | 625 | 650 | 674 | 699 | 724 | 748 | 773 | 6 | 15,0 | |
| 177 | | 797 | 822 | 846 | 871 | 895 | 920 | 944 | 969 | 993 | *018 | 7 | 17,5 | |
| 178 | 25 | 042 | 066 | 091 | 115 | 139 | 164 | 188 | 212 | 237 | 261 | 8 | 20,0 | |
| 179 | | 285 | 310 | 334 | 358 | 382 | 406 | 431 | 455 | 479 | 503 | 9 | 22,5 | |
| 180 | | 527 | 551 | 575 | 600 | 624 | 648 | 672 | 696 | 720 | 744 | 24 | 23 | |
| 181 | | 768 | 792 | 816 | 840 | 864 | 888 | 912 | 935 | 959 | 983 | 1 | 2,4 | 2,3 |
| 182 | 26 | 007 | 031 | 055 | 079 | 102 | 126 | 150 | 174 | 198 | 221 | 2 | 4,8 | 4,6 |
| 183 | | 245 | 269 | 293 | 316 | 340 | 364 | 387 | 411 | 435 | 458 | 3 | 7,2 | 6,9 |
| 184 | | 482 | 505 | 529 | 553 | 576 | 600 | 623 | 647 | 670 | 694 | 4 | 9,6 | 9,2 |
| 185 | | 717 | 741 | 764 | 788 | 811 | 834 | 858 | 881 | 905 | 928 | 5 | 12,0 | 11,5 |
| 186 | | 951 | 975 | 998 | *021 | *045 | *068 | *091 | *114 | *138 | *161 | 6 | 14,4 | 13,8 |
| 187 | 27 | 184 | 207 | 231 | 254 | 277 | 300 | 323 | 346 | 370 | 393 | 7 | 16,8 | 16,1 |
| 188 | | 416 | 439 | 462 | 485 | 508 | 531 | 554 | 577 | 600 | 623 | 8 | 19,2 | 18,4 |
| 189 | | 646 | 669 | 692 | 715 | 738 | 761 | 784 | 807 | 830 | 852 | 9 | 21,6 | 20,7 |
| 190 | | 875 | 898 | 921 | 944 | 967 | 989 | *012 | *035 | *058 | *081 | 22 | 21 | |
| 191 | 28 | 103 | 126 | 149 | 171 | 194 | 217 | 240 | 262 | 285 | 307 | 1 | 2,2 | 2,1 |
| 192 | | 330 | 353 | 375 | 398 | 421 | 443 | 466 | 488 | 511 | 533 | 2 | 4,4 | 4,2 |
| 193 | | 556 | 578 | 601 | 623 | 646 | 668 | 691 | 713 | 735 | 758 | 3 | 6,6 | 6,3 |
| 194 | | 780 | 803 | 825 | 847 | 870 | 892 | 914 | 937 | 959 | 981 | 4 | 8,8 | 8,4 |
| 195 | 29 | 003 | 026 | 048 | 070 | 092 | 115 | 137 | 159 | 181 | 203 | 5 | 11,0 | 10,5 |
| 196 | | 226 | 248 | 270 | 292 | 314 | 336 | 358 | 380 | 403 | 425 | 6 | 13,2 | 12,6 |
| 197 | | 447 | 469 | 491 | 513 | 535 | 557 | 579 | 601 | 623 | 645 | 7 | 15,4 | 14,7 |
| 198 | | 667 | 688 | 710 | 732 | 754 | 776 | 798 | 820 | 842 | 863 | 8 | 17,6 | 16,8 |
| 199 | | 885 | 907 | 929 | 951 | 973 | 994 | *016 | *038 | *060 | *081 | 9 | 19,8 | 18,9 |
| 200 | 30 | 103 | 125 | 146 | 168 | 190 | 211 | 233 | 255 | 276 | 298 | | | |
| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | | | |

FIVE-PLACE LOGARITHMS (Continued)

| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | | |
|-----|----|-----|------|------|------|------|------|------|------|------|--------------------|----|------|
| 200 | 30 | 103 | 125 | 146 | 168 | 190 | 211 | 233 | 255 | 276 | 298 | 22 | 21 |
| 201 | | 320 | 341 | 363 | 384 | 406 | 428 | 449 | 471 | 492 | 514 | 1 | 2,2 |
| 202 | | 535 | 557 | 578 | 600 | 621 | 643 | 664 | 685 | 707 | 728 | 2 | 4,4 |
| 203 | | 750 | 771 | 792 | 814 | 835 | 856 | 878 | 899 | 920 | 942 | 3 | 6,6 |
| 204 | | 963 | 984 | *006 | *027 | *048 | *069 | *091 | *112 | *133 | *154 | 4 | 8,8 |
| 205 | 31 | 175 | 197 | 218 | 239 | 260 | 281 | 302 | 323 | 345 | 366 | 5 | 11,0 |
| 206 | | 387 | 408 | 429 | 450 | 471 | 492 | 513 | 534 | 555 | 576 | 6 | 13,2 |
| 207 | | 597 | 618 | 639 | 660 | 681 | 702 | 723 | 744 | 765 | 785 | 7 | 15,4 |
| 208 | | 806 | 827 | 848 | 869 | 890 | 911 | 931 | 952 | 973 | 994 | 8 | 17,6 |
| 209 | 32 | 015 | 035 | 056 | 077 | 098 | 118 | 139 | 160 | 181 | 201 | 9 | 19,8 |
| 210 | | 222 | 243 | 263 | 284 | 305 | 325 | 346 | 366 | 387 | 408 | | 20 |
| 211 | | 428 | 449 | 469 | 490 | 510 | 531 | 552 | 572 | 593 | 613 | 1 | 2,0 |
| 212 | | 634 | 654 | 675 | 695 | 715 | 736 | 756 | 777 | 797 | 818 | 2 | 4,0 |
| 213 | | 838 | 858 | 879 | 899 | 919 | 940 | 960 | 980 | *001 | *021 | 3 | 6,0 |
| 214 | 33 | 041 | 062 | 082 | 102 | 122 | 143 | 163 | 183 | 203 | 224 | 4 | 8,0 |
| 215 | | 244 | 264 | 284 | 304 | 325 | 345 | 365 | 385 | 405 | 425 | 5 | 10,0 |
| 216 | | 445 | 465 | 486 | 506 | 526 | 546 | 566 | 586 | 606 | 626 | 6 | 12,0 |
| 217 | | 646 | 666 | 686 | 706 | 726 | 746 | 766 | 786 | 806 | 826 | 7 | 14,0 |
| 218 | | 846 | 866 | 885 | 905 | 925 | 945 | 965 | 985 | *005 | *025 | 8 | 16,0 |
| 219 | 34 | 044 | 064 | 084 | 104 | 124 | 143 | 163 | 183 | 203 | 223 | 9 | 18,0 |
| 220 | | 242 | 262 | 282 | 301 | 321 | 341 | 361 | 380 | 400 | 420 | | 19 |
| 221 | | 439 | 459 | 479 | 498 | 518 | 537 | 557 | 577 | 596 | 616 | 1 | 1,9 |
| 222 | | 635 | 655 | 674 | 694 | 713 | 733 | 753 | 772 | 792 | 811 | 2 | 3,8 |
| 223 | | 830 | 850 | 869 | 889 | 908 | 928 | 947 | 967 | 986 | *005 | 3 | 5,7 |
| 224 | 35 | 025 | 044 | 064 | 083 | 102 | 122 | 141 | 160 | 180 | 199 | 4 | 7,6 |
| 225 | | 218 | 238 | 257 | 276 | 295 | 315 | 334 | 353 | 372 | 392 | 5 | 9,5 |
| 226 | | 411 | 430 | 449 | 468 | 488 | 507 | 526 | 545 | 564 | 583 | 6 | 11,4 |
| 227 | | 603 | 622 | 641 | 660 | 679 | 698 | 717 | 736 | 755 | 774 | 7 | 13,3 |
| 228 | | 793 | 813 | 832 | 851 | 870 | 889 | 908 | 927 | 946 | 965 | 8 | 15,2 |
| 229 | | 984 | *003 | *021 | *040 | *059 | *078 | *097 | *116 | *135 | *154 | 9 | 17,1 |
| 230 | 36 | 173 | 192 | 211 | 229 | 248 | 267 | 286 | 305 | 324 | 342 | | 18 |
| 231 | | 361 | 380 | 399 | 418 | 436 | 455 | 474 | 493 | 511 | 530 | 1 | 1,8 |
| 232 | | 549 | 568 | 586 | 605 | 624 | 642 | 661 | 680 | 698 | 717 | 2 | 3,6 |
| 233 | | 736 | 754 | 773 | 791 | 810 | 829 | 847 | 866 | 884 | 903 | 3 | 5,4 |
| 234 | | 922 | 940 | 959 | 977 | 996 | *014 | *033 | *051 | *070 | *088 | 4 | 7,2 |
| 235 | 37 | 107 | 125 | 144 | 162 | 181 | 199 | 218 | 236 | 254 | 273 | 5 | 9,0 |
| 236 | | 291 | 310 | 328 | 346 | 365 | 383 | 401 | 420 | 438 | 457 | 6 | 10,8 |
| 237 | | 475 | 493 | 511 | 530 | 548 | 566 | 585 | 603 | 621 | 639 | 7 | 12,6 |
| 238 | | 658 | 676 | 694 | 712 | 731 | 749 | 767 | 785 | 803 | 822 | 8 | 14,4 |
| 239 | | 840 | 858 | 876 | 894 | 912 | 931 | 949 | 967 | 985 | *003 | 9 | 16,2 |
| 240 | 38 | 021 | 039 | 057 | 075 | 093 | 112 | 130 | 148 | 166 | 184 | | 17 |
| 241 | | 202 | 220 | 238 | 256 | 274 | 292 | 310 | 328 | 346 | 364 | 1 | 1,7 |
| 242 | | 382 | 399 | 417 | 435 | 453 | 471 | 489 | 507 | 525 | 543 | 2 | 3,4 |
| 243 | | 561 | 578 | 596 | 614 | 632 | 650 | 668 | 686 | 703 | 721 | 3 | 5,1 |
| 244 | | 739 | 757 | 775 | 792 | 810 | 828 | 846 | 863 | 881 | 899 | 4 | 6,8 |
| 245 | | 917 | 934 | 952 | 970 | 987 | *005 | *023 | *041 | *058 | *076 | 5 | 8,5 |
| 246 | 39 | 094 | 111 | 129 | 146 | 164 | 182 | 199 | 217 | 235 | 252 | 6 | 10,2 |
| 247 | | 270 | 287 | 305 | 322 | 340 | 358 | 375 | 393 | 410 | 428 | 7 | 11,9 |
| 248 | | 445 | 463 | 480 | 498 | 515 | 533 | 550 | 568 | 585 | 602 | 8 | 13,6 |
| 249 | | 620 | 637 | 655 | 672 | 690 | 707 | 724 | 742 | 759 | 777 | 9 | 15,3 |
| 250 | | 794 | 811 | 829 | 846 | 863 | 881 | 898 | 915 | 933 | 950 | | |
| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | | |

FIVE-PLACE LOGARITHMS (Continued)

| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |
|-----|----|-----|------|------|------|------|------|------|------|------|--------------------|--------|
| 250 | 39 | 794 | 811 | 829 | 846 | 863 | 881 | 898 | 915 | 933 | 950 | 18 |
| 251 | | 967 | 985 | *002 | *019 | *037 | *054 | *071 | *088 | *106 | *123 | 1 1,8 |
| 252 | 40 | 140 | 157 | 175 | 192 | 209 | 226 | 243 | 261 | 278 | 295 | 2 3,6 |
| 253 | | 312 | 329 | 346 | 364 | 381 | 398 | 415 | 432 | 449 | 466 | 3 5,4 |
| 254 | | 483 | 500 | 518 | 535 | 552 | 569 | 586 | 603 | 620 | 637 | 4 7,2 |
| 255 | | 654 | 671 | 688 | 705 | 722 | 739 | 756 | 773 | 790 | 807 | 5 9,0 |
| 256 | | 824 | 841 | 858 | 875 | 892 | 909 | 926 | 943 | 960 | 976 | 6 10,8 |
| 257 | | 993 | *010 | *027 | *044 | *061 | *078 | *095 | *111 | *128 | *145 | 7 12,6 |
| 258 | 41 | 162 | 179 | 196 | 212 | 229 | 246 | 263 | 280 | 296 | 313 | 8 14,4 |
| 259 | | 330 | 347 | 363 | 380 | 397 | 414 | 430 | 447 | 464 | 481 | 9 16,2 |
| 260 | | 497 | 514 | 531 | 547 | 564 | 581 | 597 | 614 | 631 | 647 | 17 |
| 261 | | 664 | 681 | 697 | 714 | 731 | 747 | 764 | 780 | 797 | 814 | 1 1,7 |
| 262 | | 830 | 847 | 863 | 880 | 896 | 913 | 929 | 946 | 963 | 979 | 2 3,4 |
| 263 | | 996 | *012 | *029 | *045 | *062 | *078 | *095 | *111 | *127 | *144 | 3 5,1 |
| 264 | 42 | 160 | 177 | 193 | 210 | 226 | 243 | 259 | 275 | 292 | 308 | 4 6,8 |
| 265 | | 325 | 341 | 357 | 374 | 390 | 406 | 423 | 439 | 455 | 472 | 5 8,5 |
| 266 | | 488 | 504 | 521 | 537 | 553 | 570 | 586 | 602 | 619 | 635 | 6 10,2 |
| 267 | | 651 | 667 | 684 | 700 | 716 | 732 | 749 | 765 | 781 | 797 | 7 11,9 |
| 268 | | 813 | 830 | 846 | 862 | 878 | 894 | 911 | 927 | 943 | 959 | 8 13,6 |
| 269 | | 975 | 991 | *008 | *024 | *040 | *056 | *072 | *088 | *104 | *120 | 9 15,3 |
| 270 | 43 | 136 | 152 | 169 | 185 | 201 | 217 | 233 | 249 | 265 | 281 | 16 |
| 271 | | 297 | 313 | 329 | 345 | 361 | 377 | 393 | 409 | 425 | 441 | 1 1,6 |
| 272 | | 457 | 473 | 489 | 505 | 521 | 537 | 553 | 569 | 584 | 600 | 2 3,2 |
| 273 | | 616 | 632 | 648 | 664 | 680 | 696 | 712 | 727 | 743 | 759 | 3 4,8 |
| 274 | | 775 | 791 | 807 | 823 | 838 | 854 | 870 | 886 | 902 | 917 | 4 6,4 |
| 275 | | 933 | 949 | 965 | 981 | 996 | *012 | *028 | *044 | *059 | *075 | 5 8,0 |
| 276 | 44 | 091 | 107 | 122 | 138 | 154 | 170 | 185 | 201 | 217 | 232 | 6 9,6 |
| 277 | | 248 | 264 | 279 | 295 | 311 | 326 | 342 | 358 | 373 | 389 | 7 11,2 |
| 278 | | 404 | 420 | 436 | 451 | 467 | 483 | 498 | 514 | 529 | 545 | 8 12,8 |
| 279 | | 560 | 576 | 592 | 607 | 623 | 638 | 654 | 669 | 685 | 700 | 9 14,4 |
| 280 | | 716 | 731 | 747 | 762 | 778 | 793 | 809 | 824 | 840 | 855 | 15 |
| 281 | | 871 | 886 | 902 | 917 | 932 | 948 | 963 | 979 | 994 | *010 | 1 1,5 |
| 282 | 45 | 025 | 040 | 056 | 071 | 086 | 102 | 117 | 133 | 148 | 163 | 2 3,0 |
| 283 | | 179 | 194 | 209 | 225 | 240 | 255 | 271 | 286 | 301 | 317 | 3 4,5 |
| 284 | | 332 | 347 | 362 | 378 | 393 | 408 | 423 | 439 | 454 | 469 | 4 6,0 |
| 285 | | 484 | 500 | 515 | 530 | 545 | 561 | 576 | 591 | 606 | 621 | 5 7,5 |
| 286 | | 637 | 652 | 667 | 682 | 697 | 712 | 728 | 743 | 758 | 773 | 6 9,0 |
| 287 | | 788 | 803 | 818 | 834 | 849 | 864 | 879 | 894 | 909 | 924 | 7 10,5 |
| 288 | | 939 | 954 | 969 | 984 | *000 | *015 | *030 | *045 | *060 | *075 | 8 12,0 |
| 289 | 46 | 090 | 105 | 120 | 135 | 150 | 165 | 180 | 195 | 210 | 225 | 9 13,5 |
| 290 | | 240 | 255 | 270 | 285 | 300 | 315 | 330 | 345 | 359 | 374 | 14 |
| 291 | | 389 | 404 | 419 | 434 | 449 | 464 | 479 | 494 | 509 | 523 | 1 1,4 |
| 292 | | 538 | 553 | 568 | 583 | 598 | 613 | 627 | 642 | 657 | 672 | 2 2,8 |
| 293 | | 687 | 702 | 716 | 731 | 746 | 761 | 776 | 790 | 805 | 820 | 3 4,2 |
| 294 | | 835 | 850 | 864 | 879 | 894 | 909 | 923 | 938 | 953 | 967 | 4 5,6 |
| 295 | | 982 | 997 | *012 | *026 | *041 | *056 | *070 | *085 | *100 | *114 | 5 7,0 |
| 296 | 47 | 129 | 144 | 159 | 173 | 188 | 202 | 217 | 232 | 246 | 261 | 6 8,4 |
| 297 | | 276 | 290 | 305 | 319 | 334 | 349 | 363 | 378 | 392 | 407 | 7 9,8 |
| 298 | | 422 | 436 | 451 | 465 | 480 | 494 | 509 | 524 | 538 | 553 | 8 11,2 |
| 299 | | 567 | 582 | 596 | 611 | 625 | 640 | 654 | 669 | 683 | 698 | 9 12,6 |
| 300 | | 712 | 727 | 741 | 756 | 770 | 784 | 799 | 813 | 828 | 842 | |
| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |

FIVE-PLACE LOGARITHMS (Continued)

| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |
|-----|----|-----|------|------|------|------|------|------|------|------|--------------------|----|
| 300 | 47 | 712 | 727 | 741 | 756 | 770 | 784 | 799 | 813 | 828 | 842 | |
| 301 | | 857 | 871 | 885 | 900 | 914 | 929 | 943 | 958 | 972 | 986 | |
| 302 | 48 | 001 | 015 | 029 | 044 | 058 | 073 | 087 | 101 | 116 | 130 | |
| 303 | | 144 | 159 | 173 | 187 | 202 | 216 | 230 | 244 | 259 | 273 | 15 |
| 304 | | 287 | 302 | 316 | 330 | 344 | 359 | 373 | 387 | 401 | 416 | 1 |
| 305 | | 430 | 444 | 458 | 473 | 487 | 501 | 515 | 530 | 544 | 558 | 2 |
| 306 | | 572 | 586 | 601 | 615 | 629 | 643 | 657 | 671 | 686 | 700 | 3 |
| 307 | | 714 | 728 | 742 | 756 | 770 | 785 | 799 | 813 | 827 | 841 | 4 |
| 308 | | 855 | 869 | 883 | 897 | 911 | 926 | 940 | 954 | 968 | 982 | 5 |
| 309 | | 996 | *010 | *024 | *038 | *052 | *066 | *080 | *094 | *108 | *122 | 6 |
| 310 | 49 | 136 | 150 | 164 | 178 | 192 | 206 | 220 | 234 | 248 | 262 | 7 |
| 311 | | 276 | 290 | 304 | 318 | 332 | 346 | 360 | 374 | 388 | 402 | 8 |
| 312 | | 415 | 429 | 443 | 457 | 471 | 485 | 499 | 513 | 527 | 541 | 9 |
| 313 | | 554 | 568 | 582 | 596 | 610 | 624 | 638 | 651 | 665 | 679 | |
| 314 | | 693 | 707 | 721 | 734 | 748 | 762 | 776 | 790 | 803 | 817 | |
| 315 | | 831 | 845 | 859 | 872 | 886 | 900 | 914 | 927 | 941 | 955 | 14 |
| 316 | | 969 | 982 | 996 | *010 | *024 | *037 | *051 | *065 | *079 | *092 | 1 |
| 317 | 50 | 106 | 120 | 133 | 147 | 161 | 174 | 188 | 202 | 215 | 229 | 2 |
| 318 | | 243 | 256 | 270 | 284 | 297 | 311 | 325 | 338 | 352 | 365 | 3 |
| 319 | | 379 | 393 | 406 | 420 | 433 | 447 | 461 | 474 | 488 | 501 | 4 |
| 320 | | 515 | 529 | 542 | 556 | 569 | 583 | 596 | 610 | 623 | 637 | 5 |
| 321 | | 651 | 664 | 678 | 691 | 705 | 718 | 732 | 745 | 759 | 772 | 6 |
| 322 | | 786 | 799 | 813 | 826 | 840 | 853 | 866 | 880 | 893 | 907 | 7 |
| 323 | | 920 | 934 | 947 | 961 | 974 | 987 | *001 | *014 | *028 | *041 | 8 |
| 324 | 51 | 055 | 068 | 081 | 095 | 108 | 121 | 135 | 148 | 162 | 175 | 9 |
| 325 | | 188 | 202 | 215 | 228 | 242 | 255 | 268 | 282 | 295 | 308 | |
| 326 | | 322 | 335 | 348 | 362 | 375 | 388 | 402 | 415 | 428 | 441 | |
| 327 | | 455 | 468 | 481 | 495 | 508 | 521 | 534 | 548 | 561 | 574 | 13 |
| 328 | | 587 | 601 | 614 | 627 | 640 | 654 | 667 | 680 | 693 | 706 | 1 |
| 329 | | 720 | 733 | 746 | 759 | 772 | 786 | 799 | 812 | 825 | 838 | 2 |
| 330 | | 851 | 865 | 878 | 891 | 904 | 917 | 930 | 943 | 957 | 970 | 3 |
| 331 | | 983 | 996 | *009 | *022 | *035 | *048 | *061 | *075 | *088 | *101 | 4 |
| 332 | 52 | 114 | 127 | 140 | 153 | 166 | 179 | 192 | 205 | 218 | 231 | 5 |
| 333 | | 244 | 257 | 270 | 284 | 297 | 310 | 323 | 336 | 349 | 362 | 6 |
| 334 | | 375 | 388 | 401 | 414 | 427 | 440 | 453 | 466 | 479 | 492 | 7 |
| 335 | | 504 | 517 | 530 | 543 | 556 | 569 | 582 | 595 | 608 | 621 | 8 |
| 336 | | 634 | 647 | 660 | 673 | 686 | 699 | 711 | 724 | 737 | 750 | 9 |
| 337 | | 763 | 776 | 789 | 802 | 815 | 827 | 840 | 853 | 866 | 879 | |
| 338 | | 892 | 905 | 917 | 930 | 943 | 956 | 969 | 982 | 994 | *007 | |
| 339 | 53 | 020 | 033 | 046 | 058 | 071 | 084 | 097 | 110 | 122 | 135 | 12 |
| 340 | | 148 | 161 | 173 | 186 | 199 | 212 | 224 | 237 | 250 | 263 | 1 |
| 341 | | 275 | 288 | 301 | 314 | 326 | 339 | 352 | 364 | 377 | 390 | 2 |
| 342 | | 403 | 415 | 428 | 441 | 453 | 466 | 479 | 491 | 504 | 517 | 3 |
| 343 | | 529 | 542 | 555 | 567 | 580 | 593 | 605 | 618 | 631 | 643 | 4 |
| 344 | | 656 | 668 | 681 | 694 | 706 | 719 | 732 | 744 | 757 | 769 | 5 |
| 345 | | 782 | 794 | 807 | 820 | 832 | 845 | 857 | 870 | 882 | 895 | 6 |
| 346 | | 908 | 920 | 933 | 945 | 958 | 970 | 983 | 995 | *008 | *020 | 7 |
| 347 | 54 | 033 | 045 | 058 | 070 | 083 | 095 | 108 | 120 | 133 | 145 | 8 |
| 348 | | 158 | 170 | 183 | 195 | 208 | 220 | 233 | 245 | 258 | 270 | 9 |
| 349 | | 283 | 295 | 307 | 320 | 332 | 345 | 357 | 370 | 382 | 394 | |
| 350 | | 407 | 419 | 432 | 444 | 456 | 469 | 481 | 494 | 506 | 518 | |
| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |

FIVE-PLACE LOGARITHMS (Continued)

| N. | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts |
|-----|----|-----|------|------|------|------|------|------|------|------|------|--------------------|
| 350 | 54 | 407 | 419 | 432 | 444 | 456 | 469 | 481 | 494 | 506 | 518 | |
| 351 | | 531 | 543 | 555 | 568 | 580 | 593 | 605 | 617 | 630 | 642 | |
| 352 | | 654 | 667 | 679 | 691 | 704 | 716 | 728 | 741 | 753 | 765 | |
| 353 | | 777 | 790 | 802 | 814 | 827 | 839 | 851 | 864 | 876 | 888 | 13 |
| 354 | | 900 | 913 | 925 | 937 | 949 | 962 | 974 | 986 | 998 | *011 | 1 1,3 |
| 355 | 55 | 023 | 035 | 047 | 060 | 072 | 084 | 096 | 108 | 121 | 133 | 2 2,6 |
| 356 | | 145 | 157 | 169 | 182 | 194 | 206 | 218 | 230 | 242 | 255 | 3 3,9 |
| 357 | | 267 | 279 | 291 | 303 | 315 | 328 | 340 | 352 | 364 | 376 | 4 5,2 |
| 358 | | 388 | 400 | 413 | 425 | 437 | 449 | 461 | 473 | 485 | 497 | 5 6,5 |
| 359 | | 509 | 522 | 534 | 546 | 558 | 570 | 582 | 594 | 606 | 618 | 6 7,8 |
| | | | | | | | | | | | | 7 9,1 |
| 360 | | 630 | 642 | 654 | 666 | 678 | 691 | 703 | 715 | 727 | 739 | 8 10,4 |
| 361 | | 751 | 763 | 775 | 787 | 799 | 811 | 823 | 835 | 847 | 859 | 9 11,7 |
| 362 | | 871 | 883 | 895 | 907 | 919 | 931 | 943 | 955 | 967 | 979 | |
| 363 | | 991 | *003 | *015 | *027 | *038 | *050 | *062 | *074 | *086 | *098 | |
| 364 | 56 | 110 | 122 | 134 | 146 | 158 | 170 | 182 | 194 | 205 | 217 | |
| 365 | | 229 | 241 | 253 | 265 | 277 | 289 | 301 | 312 | 324 | 336 | 12 |
| 366 | | 348 | 360 | 372 | 384 | 396 | 407 | 419 | 431 | 443 | 455 | 1 1,2 |
| 367 | | 467 | 478 | 490 | 502 | 514 | 526 | 538 | 549 | 561 | 573 | 2 2,4 |
| 368 | | 585 | 597 | 608 | 620 | 632 | 644 | 656 | 667 | 679 | 691 | 3 3,6 |
| 369 | | 703 | 714 | 726 | 738 | 750 | 761 | 773 | 785 | 797 | 808 | 4 4,8 |
| | | | | | | | | | | | | 5 6,0 |
| 370 | | 820 | 832 | 844 | 855 | 867 | 879 | 891 | 902 | 914 | 926 | 6 7,2 |
| 371 | | 937 | 949 | 961 | 972 | 984 | 996 | *008 | *019 | *031 | *043 | 7 8,4 |
| 372 | 57 | 054 | 066 | 078 | 089 | 101 | 113 | 124 | 136 | 148 | 159 | 8 9,6 |
| 373 | | 171 | 183 | 194 | 206 | 217 | 229 | 241 | 252 | 264 | 276 | 9 10,8 |
| 374 | | 287 | 299 | 310 | 322 | 334 | 345 | 357 | 368 | 380 | 392 | |
| 375 | | 403 | 415 | 426 | 438 | 449 | 461 | 473 | 484 | 496 | 507 | |
| 376 | | 519 | 530 | 542 | 553 | 565 | 576 | 588 | 600 | 611 | 623 | |
| 377 | | 634 | 646 | 657 | 669 | 680 | 692 | 703 | 715 | 726 | 738 | 11 |
| 378 | | 749 | 761 | 772 | 784 | 795 | 807 | 818 | 830 | 841 | 852 | 1 1,1 |
| 379 | | 864 | 875 | 887 | 898 | 910 | 921 | 933 | 944 | 955 | 967 | 2 2,2 |
| | | | | | | | | | | | | 3 3,3 |
| 380 | | 978 | 990 | *001 | *013 | *024 | *035 | *047 | *058 | *070 | *081 | 4 4,4 |
| 381 | 58 | 092 | 104 | 115 | 127 | 138 | 149 | 161 | 172 | 184 | 195 | 5 5,5 |
| 382 | | 206 | 218 | 229 | 240 | 252 | 263 | 274 | 286 | 297 | 309 | 6 6,6 |
| 383 | | 320 | 331 | 343 | 354 | 365 | 377 | 388 | 399 | 410 | 422 | 7 7,7 |
| 384 | | 433 | 444 | 456 | 467 | 478 | 490 | 501 | 512 | 524 | 535 | 8 8,8 |
| 385 | | 546 | 557 | 569 | 580 | 591 | 602 | 614 | 625 | 636 | 647 | 9 9,9 |
| 386 | | 659 | 670 | 681 | 692 | 704 | 715 | 726 | 737 | 749 | 760 | |
| 387 | | 771 | 782 | 794 | 805 | 816 | 827 | 838 | 850 | 861 | 872 | |
| 388 | | 883 | 894 | 906 | 917 | 928 | 939 | 950 | 961 | 973 | 984 | |
| 389 | | 995 | *006 | *017 | *028 | *040 | *051 | *062 | *073 | *084 | *095 | |
| | | | | | | | | | | | | 10 |
| 390 | 59 | 106 | 118 | 129 | 140 | 151 | 162 | 173 | 184 | 195 | 207 | 1 1,0 |
| 391 | | 218 | 229 | 240 | 251 | 262 | 273 | 284 | 295 | 306 | 318 | 2 2,0 |
| 392 | | 329 | 340 | 351 | 362 | 373 | 384 | 395 | 406 | 417 | 428 | 3 3,0 |
| 393 | | 439 | 450 | 461 | 472 | 483 | 494 | 506 | 517 | 528 | 539 | 4 4,0 |
| 394 | | 550 | 561 | 572 | 583 | 594 | 605 | 616 | 627 | 638 | 649 | 5 5,0 |
| 395 | | 660 | 671 | 682 | 693 | 704 | 715 | 726 | 737 | 748 | 759 | 6 6,0 |
| 396 | | 770 | 780 | 791 | 802 | 813 | 824 | 835 | 846 | 857 | 868 | 7 7,0 |
| 397 | | 879 | 890 | 901 | 912 | 923 | 934 | 945 | 956 | 966 | 977 | 8 8,0 |
| 398 | | 988 | 999 | *010 | *021 | *032 | *043 | *054 | *065 | *076 | *086 | 9 9,0 |
| 399 | 60 | 097 | 108 | 119 | 130 | 141 | 152 | 163 | 173 | 184 | 195 | |
| | | | | | | | | | | | | |
| 400 | | 206 | 217 | 228 | 239 | 249 | 260 | 271 | 282 | 293 | 304 | |
| | | | | | | | | | | | | |
| N. | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts |

FIVE-PLACE LOGARITHMS (Continued)

| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |
|-----|----|-----|-----|-----|-----|------|------|------|------|------|--------------------|-------|
| 400 | 60 | 206 | 217 | 228 | 239 | 249 | 260 | 271 | 282 | 293 | 304 | |
| 401 | | 314 | 325 | 336 | 347 | 358 | 369 | 379 | 390 | 401 | 412 | |
| 402 | | 423 | 433 | 444 | 455 | 466 | 477 | 487 | 498 | 509 | 520 | |
| 403 | | 531 | 541 | 552 | 563 | 574 | 584 | 595 | 606 | 617 | 627 | |
| 404 | | 638 | 649 | 660 | 670 | 681 | 692 | 703 | 713 | 724 | 735 | |
| 405 | | 746 | 756 | 767 | 778 | 788 | 799 | 810 | 821 | 831 | 842 | |
| 406 | | 853 | 863 | 874 | 885 | 895 | 906 | 917 | 927 | 938 | 949 | |
| 407 | | 959 | 970 | 981 | 991 | *002 | *013 | *023 | *034 | *045 | *055 | 11 |
| 408 | 61 | 066 | 077 | 087 | 098 | 109 | 119 | 130 | 140 | 151 | 162 | 1 1.1 |
| 409 | | 172 | 183 | 194 | 204 | 215 | 225 | 236 | 247 | 257 | 268 | 2 2.2 |
| | | | | | | | | | | | | 3 3.3 |
| 410 | | 278 | 289 | 300 | 310 | 321 | 331 | 342 | 352 | 363 | 374 | 4 4.4 |
| 411 | | 384 | 395 | 405 | 416 | 426 | 437 | 448 | 458 | 469 | 479 | 5 5.5 |
| 412 | | 490 | 500 | 511 | 521 | 532 | 542 | 553 | 563 | 574 | 584 | 6 6.6 |
| 413 | | 595 | 606 | 616 | 627 | 637 | 648 | 658 | 669 | 679 | 690 | 7 7.7 |
| 414 | | 700 | 711 | 721 | 731 | 742 | 752 | 763 | 773 | 784 | 794 | 8 8.8 |
| 415 | | 805 | 815 | 826 | 836 | 847 | 857 | 868 | 878 | 888 | 899 | 9 9.9 |
| 416 | | 909 | 920 | 930 | 941 | 951 | 962 | 972 | 982 | 993 | *003 | |
| 417 | 62 | 014 | 024 | 034 | 045 | 055 | 066 | 076 | 086 | 097 | 107 | |
| 418 | | 118 | 128 | 138 | 149 | 159 | 170 | 180 | 190 | 201 | 211 | |
| 419 | | 221 | 232 | 242 | 252 | 263 | 273 | 284 | 294 | 304 | 315 | |
| | | | | | | | | | | | | 10 |
| 420 | | 325 | 335 | 346 | 356 | 366 | 377 | 387 | 397 | 408 | 418 | 1 1.0 |
| 421 | | 428 | 439 | 449 | 459 | 469 | 480 | 490 | 500 | 511 | 521 | 2 2.0 |
| 422 | | 531 | 542 | 552 | 562 | 572 | 583 | 593 | 603 | 613 | 624 | 3 3.0 |
| 423 | | 634 | 644 | 655 | 665 | 675 | 685 | 696 | 706 | 716 | 726 | 4 4.0 |
| 424 | | 737 | 747 | 757 | 767 | 778 | 788 | 798 | 808 | 818 | 829 | 5 5.0 |
| 425 | | 839 | 849 | 859 | 870 | 880 | 890 | 900 | 910 | 921 | 931 | 6 6.0 |
| 426 | | 941 | 951 | 961 | 972 | 982 | 992 | *002 | *012 | *022 | *033 | 7 7.0 |
| 427 | 63 | 043 | 053 | 063 | 073 | 083 | 094 | 104 | 114 | 124 | 134 | 8 8.0 |
| 428 | | 144 | 155 | 165 | 175 | 185 | 195 | 205 | 215 | 225 | 236 | 9 9.0 |
| 429 | | 246 | 256 | 266 | 276 | 286 | 296 | 306 | 317 | 327 | 337 | |
| | | | | | | | | | | | | 9 |
| 430 | | 347 | 357 | 367 | 377 | 387 | 397 | 407 | 417 | 428 | 438 | |
| 431 | | 448 | 458 | 468 | 478 | 488 | 498 | 508 | 518 | 528 | 538 | |
| 432 | | 548 | 558 | 568 | 579 | 589 | 599 | 609 | 619 | 629 | 639 | |
| 433 | | 649 | 659 | 669 | 679 | 689 | 699 | 709 | 719 | 729 | 739 | |
| 434 | | 749 | 759 | 769 | 779 | 789 | 799 | 809 | 819 | 829 | 839 | |
| 435 | | 849 | 859 | 869 | 879 | 889 | 899 | 909 | 919 | 929 | 939 | 9 |
| 436 | | 949 | 959 | 969 | 979 | 988 | 998 | *008 | *018 | *028 | *038 | 1 0.9 |
| 437 | 64 | 048 | 058 | 068 | 078 | 088 | 098 | 108 | 118 | 128 | 137 | 2 1.8 |
| 438 | | 147 | 157 | 167 | 177 | 187 | 197 | 207 | 217 | 227 | 237 | 3 2.7 |
| 439 | | 246 | 256 | 266 | 276 | 286 | 296 | 306 | 316 | 326 | 335 | 4 3.6 |
| | | | | | | | | | | | | 5 4.5 |
| 440 | | 345 | 355 | 365 | 375 | 385 | 395 | 404 | 414 | 424 | 434 | 6 5.4 |
| 441 | | 444 | 454 | 464 | 473 | 483 | 493 | 503 | 513 | 523 | 532 | 7 6.3 |
| 442 | | 542 | 552 | 562 | 572 | 582 | 591 | 601 | 611 | 621 | 631 | 8 7.2 |
| 443 | | 640 | 650 | 660 | 670 | 680 | 689 | 699 | 709 | 719 | 729 | 9 8.1 |
| 444 | | 738 | 748 | 758 | 768 | 777 | 787 | 797 | 807 | 816 | 826 | |
| 445 | | 836 | 846 | 856 | 865 | 875 | 885 | 895 | 904 | 914 | 924 | |
| 446 | | 933 | 943 | 953 | 963 | 972 | 982 | 992 | *002 | *011 | *021 | |
| 447 | 65 | 031 | 040 | 050 | 060 | 070 | 079 | 089 | 099 | 108 | 118 | |
| 448 | | 128 | 137 | 147 | 157 | 167 | 176 | 186 | 196 | 205 | 215 | |
| 449 | | 225 | 234 | 244 | 254 | 263 | 273 | 283 | 292 | 302 | 312 | |
| 450 | | 321 | 331 | 341 | 350 | 360 | 369 | 379 | 389 | 398 | 408 | |
| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |

FIVE-PLACE LOGARITHMS (Continued)

| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |
|-----|----|-----|------|------|------|------|------|------|------|------|--------------------|-------|
| 450 | 65 | 321 | 331 | 341 | 350 | 360 | 369 | 379 | 389 | 398 | 408 | |
| 451 | | 418 | 427 | 437 | 447 | 456 | 466 | 475 | 485 | 495 | 504 | |
| 452 | | 514 | 523 | 533 | 543 | 552 | 562 | 571 | 581 | 591 | 600 | |
| 453 | | 610 | 619 | 629 | 639 | 648 | 658 | 667 | 677 | 686 | 696 | |
| 454 | | 706 | 715 | 725 | 734 | 744 | 753 | 763 | 772 | 782 | 792 | |
| 455 | | 801 | 811 | 820 | 830 | 839 | 849 | 858 | 868 | 877 | 887 | |
| 456 | | 896 | 906 | 916 | 925 | 935 | 944 | 954 | 963 | 973 | 982 | |
| 457 | | 992 | *001 | *011 | *020 | *030 | *039 | *049 | *058 | *068 | *077 | 10 |
| 458 | 66 | 087 | 096 | 106 | 115 | 124 | 134 | 143 | 153 | 162 | 172 | 1 1.0 |
| 459 | | 181 | 191 | 200 | 210 | 219 | 229 | 238 | 247 | 257 | 266 | 2 2.0 |
| 460 | | 276 | 285 | 295 | 304 | 314 | 323 | 332 | 342 | 351 | 361 | 3 3.0 |
| 461 | | 370 | 380 | 389 | 398 | 408 | 417 | 427 | 436 | 445 | 455 | 4 4.0 |
| 462 | | 464 | 474 | 483 | 492 | 502 | 511 | 521 | 530 | 539 | 549 | 5 5.0 |
| 463 | | 558 | 567 | 577 | 586 | 596 | 605 | 614 | 624 | 633 | 642 | 6 6.0 |
| 464 | | 652 | 661 | 671 | 680 | 689 | 699 | 708 | 717 | 727 | 736 | 7 7.0 |
| 465 | | 745 | 755 | 764 | 773 | 783 | 792 | 801 | 811 | 820 | 829 | 8 8.0 |
| 466 | | 839 | 848 | 857 | 867 | 876 | 885 | 894 | 904 | 913 | 922 | 9 9.0 |
| 467 | | 932 | 941 | 950 | 960 | 969 | 978 | 987 | 997 | *006 | *015 | |
| 468 | 67 | 025 | 034 | 043 | 052 | 062 | 071 | 080 | 089 | 099 | 108 | |
| 469 | | 117 | 127 | 136 | 145 | 154 | 164 | 173 | 182 | 191 | 201 | |
| 470 | | 210 | 219 | 228 | 237 | 247 | 256 | 265 | 274 | 284 | 293 | |
| 471 | | 302 | 311 | 321 | 330 | 339 | 348 | 357 | 367 | 376 | 385 | 0 |
| 472 | | 394 | 403 | 413 | 422 | 431 | 440 | 449 | 459 | 468 | 477 | 1 0.9 |
| 473 | | 486 | 495 | 504 | 514 | 523 | 532 | 541 | 550 | 560 | 569 | 2 1.8 |
| 474 | | 578 | 587 | 596 | 605 | 614 | 624 | 633 | 642 | 651 | 660 | 3 2.7 |
| 475 | | 669 | 679 | 688 | 697 | 706 | 715 | 724 | 733 | 742 | 752 | 4 3.6 |
| 476 | | 761 | 770 | 779 | 788 | 797 | 806 | 815 | 825 | 834 | 843 | 5 4.5 |
| 477 | | 852 | 861 | 870 | 879 | 888 | 897 | 906 | 916 | 925 | 934 | 6 5.4 |
| 478 | | 943 | 952 | 961 | 970 | 979 | 988 | 997 | *006 | *015 | *024 | 7 6.3 |
| 479 | 68 | 034 | 043 | 052 | 061 | 070 | 079 | 088 | 097 | 106 | 115 | 8 7.2 |
| 480 | | 124 | 133 | 142 | 151 | 160 | 169 | 178 | 187 | 196 | 205 | 9 8.1 |
| 481 | | 215 | 224 | 233 | 242 | 251 | 260 | 269 | 278 | 287 | 296 | |
| 482 | | 305 | 314 | 323 | 332 | 341 | 350 | 359 | 368 | 377 | 386 | |
| 483 | | 395 | 404 | 413 | 422 | 431 | 440 | 449 | 458 | 467 | 476 | |
| 484 | | 485 | 494 | 502 | 511 | 520 | 529 | 538 | 547 | 556 | 565 | |
| 485 | | 574 | 583 | 592 | 601 | 610 | 619 | 628 | 637 | 646 | 655 | 8 |
| 486 | | 664 | 673 | 681 | 690 | 699 | 708 | 717 | 726 | 735 | 744 | 1 0.8 |
| 487 | | 753 | 762 | 771 | 780 | 789 | 797 | 806 | 815 | 824 | 833 | 2 1.6 |
| 488 | | 842 | 851 | 860 | 869 | 878 | 886 | 895 | 904 | 913 | 922 | 3 2.4 |
| 489 | | 931 | 940 | 949 | 958 | 966 | 975 | 984 | 993 | *002 | *011 | 4 3.2 |
| 490 | 69 | 020 | 028 | 037 | 046 | 055 | 064 | 073 | 082 | 090 | 099 | 5 4.0 |
| 491 | | 108 | 117 | 126 | 135 | 144 | 152 | 161 | 170 | 179 | 188 | 6 4.8 |
| 492 | | 197 | 205 | 214 | 223 | 232 | 241 | 249 | 258 | 267 | 276 | 7 5.6 |
| 493 | | 285 | 294 | 302 | 311 | 320 | 329 | 338 | 346 | 355 | 364 | 8 6.4 |
| 494 | | 373 | 381 | 390 | 399 | 408 | 417 | 425 | 434 | 443 | 452 | 9 7.2 |
| 495 | | 461 | 469 | 478 | 487 | 496 | 504 | 513 | 522 | 531 | 539 | |
| 496 | | 548 | 557 | 566 | 574 | 583 | 592 | 601 | 609 | 618 | 627 | |
| 497 | | 636 | 644 | 653 | 662 | 671 | 679 | 688 | 697 | 705 | 714 | |
| 498 | | 723 | 732 | 740 | 749 | 758 | 767 | 775 | 784 | 793 | 801 | |
| 499 | | 810 | 819 | 827 | 836 | 845 | 854 | 862 | 871 | 880 | 888 | |
| 500 | | 897 | 906 | 914 | 923 | 932 | 940 | 949 | 958 | 966 | 975 | |
| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |

FIVE-PLACE LOGARITHMS (Continued)

| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |
|-----|----|-----|------|------|------|------|------|------|------|------|--------------------|--|
| 500 | 69 | 897 | 906 | 914 | 923 | 932 | 940 | 949 | 958 | 966 | 975 | |
| 501 | | 984 | 992 | *001 | *010 | *018 | *027 | *036 | *044 | *053 | *062 | |
| 502 | 70 | 070 | 079 | 088 | 096 | 105 | 114 | 122 | 131 | 140 | 148 | |
| 503 | | 157 | 165 | 174 | 183 | 191 | 200 | 209 | 217 | 226 | 234 | |
| 504 | | 243 | 252 | 260 | 269 | 278 | 286 | 295 | 303 | 312 | 321 | |
| 505 | | 329 | 338 | 346 | 355 | 364 | 372 | 381 | 389 | 398 | 406 | |
| 506 | | 415 | 424 | 432 | 441 | 449 | 458 | 467 | 475 | 484 | 492 | |
| 507 | | 501 | 509 | 518 | 526 | 535 | 544 | 552 | 561 | 569 | 578 | |
| 508 | | 586 | 595 | 603 | 612 | 621 | 629 | 638 | 646 | 655 | 663 | |
| 509 | | 672 | 680 | 689 | 697 | 706 | 714 | 723 | 731 | 740 | 749 | |
| 510 | | 757 | 766 | 774 | 783 | 791 | 800 | 808 | 817 | 825 | 834 | |
| 511 | | 842 | 851 | 859 | 868 | 876 | 885 | 893 | 902 | 910 | 919 | |
| 512 | | 927 | 935 | 944 | 952 | 961 | 969 | 978 | 986 | 995 | *003 | |
| 513 | 71 | 012 | 020 | 029 | 037 | 046 | 054 | 063 | 071 | 079 | 088 | |
| 514 | | 096 | 105 | 113 | 122 | 130 | 139 | 147 | 155 | 164 | 172 | |
| 515 | | 181 | 189 | 198 | 206 | 214 | 223 | 231 | 240 | 248 | 257 | |
| 516 | | 265 | 273 | 282 | 290 | 299 | 307 | 315 | 324 | 332 | 341 | |
| 517 | | 349 | 357 | 366 | 374 | 383 | 391 | 399 | 408 | 416 | 425 | |
| 518 | | 433 | 441 | 450 | 458 | 466 | 475 | 483 | 492 | 500 | 508 | |
| 519 | | 517 | 525 | 533 | 542 | 550 | 559 | 567 | 575 | 584 | 592 | |
| 520 | | 600 | 609 | 617 | 625 | 634 | 642 | 650 | 659 | 667 | 675 | |
| 521 | | 684 | 692 | 700 | 709 | 717 | 725 | 734 | 742 | 750 | 759 | |
| 522 | | 767 | 775 | 784 | 792 | 800 | 809 | 817 | 825 | 834 | 842 | |
| 523 | | 850 | 858 | 867 | 875 | 883 | 892 | 900 | 908 | 917 | 925 | |
| 524 | | 933 | 941 | 950 | 958 | 966 | 975 | 983 | 991 | 999 | *008 | |
| 525 | 72 | 016 | 024 | 032 | 041 | 049 | 057 | 066 | 074 | 082 | 090 | |
| 526 | | 099 | 107 | 115 | 123 | 132 | 140 | 148 | 156 | 165 | 173 | |
| 527 | | 181 | 189 | 198 | 206 | 214 | 222 | 230 | 239 | 247 | 255 | |
| 528 | | 263 | 272 | 280 | 288 | 296 | 304 | 313 | 321 | 329 | 337 | |
| 529 | | 346 | 354 | 362 | 370 | 378 | 387 | 395 | 403 | 411 | 419 | |
| 530 | | 428 | 436 | 444 | 452 | 460 | 469 | 477 | 485 | 493 | 501 | |
| 531 | | 509 | 518 | 526 | 534 | 542 | 550 | 558 | 567 | 575 | 583 | |
| 532 | | 591 | 599 | 607 | 616 | 624 | 632 | 640 | 648 | 656 | 665 | |
| 533 | | 673 | 681 | 689 | 697 | 705 | 713 | 722 | 730 | 738 | 746 | |
| 534 | | 754 | 762 | 770 | 779 | 787 | 795 | 803 | 811 | 819 | 827 | |
| 535 | | 835 | 843 | 852 | 860 | 868 | 876 | 884 | 892 | 900 | 908 | |
| 536 | | 916 | 925 | 933 | 941 | 949 | 957 | 965 | 973 | 981 | 989 | |
| 537 | | 997 | *006 | *014 | *022 | *030 | *038 | *046 | *054 | *062 | *070 | |
| 538 | 73 | 078 | 086 | 094 | 102 | 111 | 119 | 127 | 135 | 143 | 151 | |
| 539 | | 159 | 167 | 175 | 183 | 191 | 199 | 207 | 215 | 223 | 231 | |
| 540 | | 239 | 247 | 255 | 263 | 272 | 280 | 288 | 296 | 304 | 312 | |
| 541 | | 320 | 328 | 336 | 344 | 352 | 360 | 368 | 376 | 384 | 392 | |
| 542 | | 400 | 408 | 416 | 424 | 432 | 440 | 448 | 456 | 464 | 472 | |
| 543 | | 480 | 488 | 496 | 504 | 512 | 520 | 528 | 536 | 544 | 552 | |
| 544 | | 560 | 568 | 576 | 584 | 592 | 600 | 608 | 616 | 624 | 632 | |
| 545 | | 640 | 648 | 656 | 664 | 672 | 679 | 687 | 695 | 703 | 711 | |
| 546 | | 719 | 727 | 735 | 743 | 751 | 759 | 767 | 775 | 783 | 791 | |
| 547 | | 799 | 807 | 815 | 823 | 830 | 838 | 846 | 854 | 862 | 870 | |
| 548 | | 878 | 886 | 894 | 902 | 910 | 918 | 926 | 933 | 941 | 949 | |
| 549 | | 957 | 965 | 973 | 981 | 989 | 997 | *005 | *013 | *020 | *028 | |
| 550 | 74 | 036 | 044 | 052 | 060 | 068 | 076 | 084 | 092 | 099 | 107 | |
| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |

FIVE-PLACE LOGARITHMS (Continued)

| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |
|-----|----|-----|-----|-----|-----|------|------|------|------|------|--------------------|-------|
| 550 | 74 | 036 | 044 | 052 | 060 | 068 | 076 | 084 | 092 | 099 | 107 | |
| 551 | | 115 | 123 | 131 | 139 | 147 | 155 | 162 | 170 | 178 | 186 | |
| 552 | | 194 | 202 | 210 | 218 | 225 | 233 | 241 | 249 | 257 | 265 | |
| 553 | | 273 | 280 | 288 | 296 | 304 | 312 | 320 | 327 | 335 | 343 | |
| 554 | | 351 | 359 | 367 | 374 | 382 | 390 | 398 | 406 | 414 | 421 | |
| 555 | | 429 | 437 | 445 | 453 | 461 | 468 | 476 | 484 | 492 | 500 | |
| 556 | | 507 | 515 | 523 | 531 | 539 | 547 | 554 | 562 | 570 | 578 | |
| 557 | | 586 | 593 | 601 | 609 | 617 | 624 | 632 | 640 | 648 | 656 | |
| 558 | | 663 | 671 | 679 | 687 | 695 | 702 | 710 | 718 | 726 | 733 | |
| 559 | | 741 | 749 | 757 | 764 | 772 | 780 | 788 | 796 | 803 | 811 | |
| 560 | | 819 | 827 | 834 | 842 | 850 | 858 | 865 | 873 | 881 | 889 | 8 |
| 561 | | 896 | 904 | 912 | 920 | 927 | 935 | 943 | 950 | 958 | 966 | 1 0.8 |
| 562 | | 974 | 981 | 989 | 997 | *005 | *012 | *020 | *028 | *035 | *043 | 2 1.6 |
| 563 | 75 | 051 | 059 | 066 | 074 | 082 | 089 | 097 | 105 | 113 | 120 | 3 2.4 |
| 564 | | 128 | 136 | 143 | 151 | 159 | 166 | 174 | 182 | 189 | 197 | 4 3.2 |
| 565 | | 205 | 213 | 220 | 228 | 236 | 243 | 251 | 259 | 266 | 274 | 5 4.0 |
| 566 | | 282 | 289 | 297 | 305 | 312 | 320 | 328 | 335 | 343 | 351 | 6 4.8 |
| 567 | | 358 | 366 | 374 | 381 | 389 | 397 | 404 | 412 | 420 | 427 | 7 5.6 |
| 568 | | 435 | 442 | 450 | 458 | 465 | 473 | 481 | 488 | 496 | 504 | 8 6.4 |
| 569 | | 511 | 519 | 526 | 534 | 542 | 549 | 557 | 565 | 572 | 580 | 9 7.2 |
| 570 | | 587 | 595 | 603 | 610 | 618 | 626 | 633 | 641 | 648 | 656 | |
| 571 | | 664 | 671 | 679 | 686 | 694 | 702 | 709 | 717 | 724 | 732 | |
| 572 | | 740 | 747 | 755 | 762 | 770 | 778 | 785 | 793 | 800 | 808 | |
| 573 | | 815 | 823 | 831 | 838 | 846 | 853 | 861 | 868 | 876 | 884 | |
| 574 | | 891 | 899 | 906 | 914 | 921 | 929 | 937 | 944 | 952 | 959 | |
| 575 | | 967 | 974 | 982 | 989 | 997 | *005 | *012 | *020 | *027 | *035 | |
| 576 | 76 | 042 | 050 | 057 | 065 | 072 | 080 | 087 | 095 | 103 | 110 | |
| 577 | | 118 | 125 | 133 | 140 | 148 | 155 | 163 | 170 | 178 | 185 | |
| 578 | | 193 | 200 | 208 | 215 | 223 | 230 | 238 | 245 | 253 | 260 | |
| 579 | | 268 | 275 | 283 | 290 | 298 | 305 | 313 | 320 | 328 | 335 | |
| 580 | | 343 | 350 | 358 | 365 | 373 | 380 | 388 | 395 | 403 | 410 | 7 |
| 581 | | 418 | 425 | 433 | 440 | 448 | 455 | 462 | 470 | 477 | 485 | 1 0.7 |
| 582 | | 492 | 500 | 507 | 515 | 522 | 530 | 537 | 545 | 552 | 559 | 2 1.4 |
| 583 | | 567 | 574 | 582 | 589 | 597 | 604 | 612 | 619 | 626 | 634 | 3 2.1 |
| 584 | | 641 | 649 | 656 | 664 | 671 | 678 | 686 | 693 | 701 | 708 | 4 2.8 |
| 585 | | 716 | 723 | 730 | 738 | 745 | 753 | 760 | 768 | 775 | 782 | 5 3.5 |
| 586 | | 790 | 797 | 805 | 812 | 819 | 827 | 834 | 842 | 849 | 856 | 6 4.2 |
| 587 | | 864 | 871 | 879 | 886 | 893 | 901 | 908 | 916 | 923 | 930 | 7 4.9 |
| 588 | | 938 | 945 | 953 | 960 | 967 | 975 | 982 | 989 | 997 | *004 | 8 5.6 |
| 589 | 77 | 012 | 019 | 026 | 034 | 041 | 048 | 056 | 063 | 070 | 078 | 9 6.3 |
| 590 | | 085 | 093 | 100 | 107 | 115 | 122 | 129 | 137 | 144 | 151 | |
| 591 | | 159 | 166 | 173 | 181 | 188 | 195 | 203 | 210 | 217 | 225 | |
| 592 | | 232 | 240 | 247 | 254 | 262 | 269 | 276 | 283 | 291 | 298 | |
| 593 | | 305 | 313 | 320 | 327 | 335 | 342 | 349 | 357 | 364 | 371 | |
| 594 | | 379 | 386 | 393 | 401 | 408 | 415 | 422 | 430 | 437 | 444 | |
| 595 | | 452 | 459 | 466 | 474 | 481 | 488 | 495 | 503 | 510 | 517 | |
| 596 | | 525 | 532 | 539 | 546 | 554 | 561 | 568 | 576 | 583 | 590 | |
| 597 | | 597 | 605 | 612 | 619 | 627 | 634 | 641 | 648 | 656 | 663 | |
| 598 | | 670 | 677 | 685 | 692 | 699 | 706 | 714 | 721 | 728 | 735 | |
| 599 | | 743 | 750 | 757 | 764 | 772 | 779 | 786 | 793 | 801 | 808 | |
| 600 | | 815 | 822 | 830 | 837 | 844 | 851 | 859 | 866 | 873 | 880 | |
| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |

FIVE-PLACE LOGARITHMS (Continued)

| N. | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts |
|-----|----|-----|-----|-----|-----|-----|-----|------|------|------|------|--------------------|
| 600 | 77 | 815 | 822 | 830 | 837 | 844 | 851 | 859 | 366 | 873 | 880 | |
| 601 | | 887 | 895 | 902 | 909 | 916 | 924 | 931 | 938 | 945 | 952 | |
| 602 | | 960 | 967 | 974 | 981 | 988 | 996 | *003 | *010 | *017 | *025 | |
| 603 | 78 | 032 | 039 | 046 | 053 | 061 | 068 | 075 | 082 | 089 | 097 | |
| 604 | | 104 | 111 | 118 | 125 | 132 | 140 | 147 | 154 | 161 | 168 | |
| 605 | | 176 | 183 | 190 | 197 | 204 | 211 | 219 | 226 | 233 | 240 | |
| 606 | | 247 | 254 | 262 | 269 | 276 | 283 | 290 | 297 | 305 | 312 | |
| 607 | | 319 | 326 | 333 | 340 | 347 | 355 | 362 | 369 | 376 | 383 | |
| 608 | | 390 | 398 | 405 | 412 | 419 | 426 | 433 | 440 | 447 | 455 | |
| 609 | | 462 | 469 | 476 | 483 | 490 | 497 | 504 | 512 | 519 | 526 | |
| 610 | | 533 | 540 | 547 | 554 | 561 | 569 | 576 | 583 | 590 | 597 | |
| 611 | | 604 | 611 | 618 | 625 | 633 | 640 | 647 | 654 | 661 | 668 | |
| 612 | | 675 | 682 | 689 | 696 | 704 | 711 | 718 | 725 | 732 | 739 | |
| 613 | | 746 | 753 | 760 | 767 | 774 | 781 | 789 | 796 | 803 | 810 | |
| 614 | | 817 | 824 | 831 | 838 | 845 | 852 | 859 | 866 | 873 | 880 | |
| 615 | | 888 | 895 | 902 | 909 | 916 | 923 | 930 | 937 | 944 | 951 | |
| 616 | | 958 | 965 | 972 | 979 | 986 | 993 | *000 | *007 | *014 | *021 | |
| 617 | 79 | 029 | 036 | 043 | 050 | 057 | 064 | 071 | 078 | 085 | 092 | |
| 618 | | 099 | 106 | 113 | 120 | 127 | 134 | 141 | 148 | 155 | 162 | |
| 619 | | 169 | 176 | 183 | 190 | 197 | 204 | 211 | 218 | 225 | 232 | |
| 620 | | 239 | 246 | 253 | 260 | 267 | 274 | 281 | 288 | 295 | 302 | |
| 621 | | 309 | 316 | 323 | 330 | 337 | 344 | 351 | 358 | 365 | 372 | |
| 622 | | 379 | 386 | 393 | 400 | 407 | 414 | 421 | 428 | 435 | 442 | |
| 623 | | 449 | 456 | 463 | 470 | 477 | 484 | 491 | 498 | 505 | 511 | |
| 624 | | 518 | 525 | 532 | 539 | 546 | 553 | 560 | 567 | 574 | 581 | |
| 625 | | 588 | 595 | 602 | 609 | 616 | 623 | 630 | 637 | 644 | 650 | |
| 626 | | 657 | 664 | 671 | 678 | 685 | 692 | 699 | 706 | 713 | 720 | |
| 627 | | 727 | 734 | 741 | 748 | 754 | 761 | 768 | 775 | 782 | 789 | |
| 628 | | 796 | 803 | 810 | 817 | 824 | 831 | 837 | 844 | 851 | 858 | |
| 629 | | 865 | 872 | 879 | 886 | 893 | 900 | 906 | 913 | 920 | 927 | |
| 630 | | 934 | 941 | 948 | 955 | 962 | 969 | 975 | 982 | 989 | 996 | |
| 631 | 80 | 003 | 010 | 017 | 024 | 030 | 037 | 044 | 051 | 058 | 065 | |
| 632 | | 072 | 079 | 085 | 092 | 099 | 106 | 113 | 120 | 127 | 134 | |
| 633 | | 140 | 147 | 154 | 161 | 168 | 175 | 182 | 188 | 195 | 202 | |
| 634 | | 209 | 216 | 223 | 229 | 236 | 243 | 250 | 257 | 264 | 271 | |
| 635 | | 277 | 284 | 291 | 298 | 305 | 312 | 318 | 325 | 332 | 339 | |
| 636 | | 346 | 353 | 359 | 366 | 373 | 380 | 387 | 393 | 400 | 407 | |
| 637 | | 414 | 421 | 428 | 434 | 441 | 448 | 455 | 462 | 468 | 475 | |
| 638 | | 482 | 489 | 496 | 502 | 509 | 516 | 523 | 530 | 536 | 543 | |
| 639 | | 550 | 557 | 564 | 570 | 577 | 584 | 591 | 598 | 604 | 611 | |
| 640 | | 618 | 625 | 632 | 638 | 645 | 652 | 659 | 665 | 672 | 679 | |
| 641 | | 686 | 693 | 699 | 706 | 713 | 720 | 726 | 733 | 740 | 747 | |
| 642 | | 754 | 760 | 767 | 774 | 781 | 787 | 794 | 801 | 808 | 814 | |
| 643 | | 821 | 828 | 835 | 841 | 848 | 855 | 862 | 868 | 875 | 882 | |
| 644 | | 889 | 895 | 902 | 909 | 916 | 922 | 929 | 936 | 943 | 949 | |
| 645 | | 956 | 963 | 969 | 976 | 983 | 990 | 996 | *003 | *010 | *017 | |
| 646 | 81 | 023 | 030 | 037 | 043 | 050 | 057 | 064 | 070 | 077 | 084 | |
| 647 | | 090 | 097 | 104 | 111 | 117 | 124 | 131 | 137 | 144 | 151 | |
| 648 | | 158 | 164 | 171 | 178 | 184 | 191 | 198 | 204 | 211 | 218 | |
| 649 | | 224 | 231 | 238 | 245 | 251 | 258 | 265 | 271 | 278 | 285 | |
| 650 | | 291 | 298 | 305 | 311 | 318 | 325 | 331 | 338 | 345 | 351 | |
| N. | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts |

FIVE-PLACE LOGARITHMS (Continued)

| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |
|-----|----|-----|------|------|------|------|------|------|------|------|--------------------|---------|
| 650 | 81 | 291 | 298 | 305 | 311 | 318 | 325 | 331 | 338 | 345 | 351 | |
| 651 | | 358 | 365 | 371 | 378 | 385 | 391 | 398 | 405 | 411 | 418 | |
| 652 | | 425 | 431 | 438 | 445 | 451 | 458 | 465 | 471 | 478 | 485 | |
| 653 | | 491 | 498 | 505 | 511 | 518 | 525 | 531 | 538 | 544 | 551 | |
| 654 | | 558 | 564 | 571 | 578 | 584 | 591 | 598 | 604 | 611 | 617 | |
| 655 | | 624 | 631 | 637 | 644 | 651 | 657 | 664 | 671 | 677 | 684 | |
| 656 | | 690 | 697 | 704 | 710 | 717 | 723 | 730 | 737 | 743 | 750 | |
| 657 | | 757 | 763 | 770 | 776 | 783 | 790 | 796 | 803 | 809 | 816 | |
| 658 | | 823 | 829 | 836 | 842 | 849 | 856 | 862 | 869 | 875 | 882 | |
| 659 | | 889 | 895 | 902 | 908 | 915 | 921 | 928 | 935 | 941 | 948 | |
| 660 | | 954 | 961 | 968 | 974 | 981 | 987 | 994 | *000 | *007 | *014 | 7 |
| 661 | 82 | 020 | 027 | 033 | 040 | 046 | 053 | 060 | 066 | 073 | 079 | 1 0.7 |
| 662 | | 086 | 092 | 099 | 105 | 112 | 119 | 125 | 132 | 138 | 145 | 2 1.4 |
| 663 | | 151 | 158 | 164 | 171 | 178 | 184 | 191 | 197 | 204 | 210 | 3 2.1 |
| 664 | | 217 | 223 | 230 | 236 | 243 | 249 | 256 | 263 | 269 | 276 | 4 2.8 |
| 665 | | 282 | 289 | 295 | 302 | 308 | 315 | 321 | 328 | 334 | 341 | 5 3.5 |
| 666 | | 347 | 354 | 360 | 367 | 373 | 380 | 387 | 393 | 400 | 406 | 6 4.2 |
| 667 | | 413 | 419 | 426 | 432 | 439 | 445 | 452 | 458 | 465 | 471 | 7 4.9 |
| 668 | | 478 | 484 | 491 | 497 | 504 | 510 | 517 | 523 | 530 | 536 | 8 5.6 |
| 669 | | 543 | 549 | 556 | 562 | 569 | 575 | 582 | 588 | 595 | 601 | 9 6.3 |
| 670 | | 607 | 614 | 620 | 627 | 633 | 640 | 646 | 653 | 659 | 666 | |
| 671 | | 672 | 679 | 685 | 692 | 698 | 705 | 711 | 718 | 724 | 730 | |
| 672 | | 737 | 743 | 750 | 756 | 763 | 769 | 776 | 782 | 789 | 795 | |
| 673 | | 802 | 808 | 814 | 821 | 827 | 834 | 840 | 847 | 853 | 860 | |
| 674 | | 866 | 872 | 879 | 885 | 892 | 898 | 905 | 911 | 918 | 924 | |
| 675 | | 930 | 937 | 943 | 950 | 956 | 963 | 969 | 975 | 982 | 988 | |
| 676 | | 995 | *001 | *008 | *014 | *020 | *027 | *033 | *040 | *046 | *052 | |
| 677 | 83 | 059 | 065 | 072 | 078 | 085 | 091 | 097 | 104 | 110 | 117 | |
| 678 | | 123 | 129 | 136 | 142 | 149 | 155 | 161 | 168 | 174 | 181 | |
| 679 | | 187 | 193 | 200 | 206 | 213 | 219 | 225 | 232 | 238 | 245 | |
| 680 | | 251 | 257 | 264 | 270 | 276 | 283 | 289 | 296 | 302 | 308 | 6 |
| 681 | | 315 | 321 | 327 | 334 | 340 | 347 | 353 | 359 | 366 | 372 | 1 0.6 |
| 682 | | 378 | 385 | 391 | 398 | 404 | 410 | 417 | 423 | 429 | 436 | 2 1.2 |
| 683 | | 442 | 448 | 455 | 461 | 467 | 474 | 480 | 487 | 493 | 499 | 3 1.8 |
| 684 | | 506 | 512 | 518 | 525 | 531 | 537 | 544 | 550 | 556 | 563 | 4 2.4 |
| 685 | | 569 | 575 | 582 | 588 | 594 | 601 | 607 | 613 | 620 | 626 | 5 3.0 |
| 686 | | 632 | 639 | 645 | 651 | 658 | 664 | 670 | 677 | 683 | 689 | 6 3.6 |
| 687 | | 696 | 702 | 708 | 715 | 721 | 727 | 734 | 740 | 746 | 753 | 7 4.2 |
| 688 | | 759 | 765 | 771 | 778 | 784 | 790 | 797 | 803 | 809 | 816 | 8 4.8 |
| 689 | | 822 | 828 | 835 | 841 | 847 | 853 | 860 | 866 | 872 | 879 | 9 5.4 |
| 690 | | 885 | 891 | 897 | 904 | 910 | 916 | 923 | 929 | 935 | 942 | |
| 691 | | 948 | 954 | 960 | 967 | 973 | 979 | 985 | 992 | 998 | *004 | |
| 692 | 84 | 011 | 017 | 023 | 029 | 036 | 042 | 048 | 055 | 061 | 067 | |
| 693 | | 073 | 080 | 086 | 092 | 098 | 105 | 111 | 117 | 123 | 130 | |
| 694 | | 136 | 142 | 148 | 155 | 161 | 167 | 173 | 180 | 186 | 192 | |
| 695 | | 198 | 205 | 211 | 217 | 223 | 230 | 236 | 242 | 248 | 255 | |
| 696 | | 261 | 267 | 273 | 280 | 286 | 292 | 298 | 305 | 311 | 317 | |
| 697 | | 323 | 330 | 336 | 342 | 348 | 354 | 361 | 367 | 373 | 379 | |
| 698 | | 386 | 392 | 398 | 404 | 410 | 417 | 423 | 429 | 435 | 442 | |
| 699 | | 448 | 454 | 460 | 466 | 473 | 479 | 485 | 491 | 497 | 504 | |
| 700 | | 510 | 516 | 522 | 528 | 535 | 541 | 547 | 553 | 559 | 566 | |
| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |

FIVE-PLACE LOGARITHMS (Continued)

| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |
|-----|----|-----|-----|-----|-----|------|------|------|------|------|--------------------|-------|
| 700 | 84 | 510 | 516 | 522 | 528 | 535 | 541 | 547 | 553 | 559 | 566 | |
| 701 | | 572 | 578 | 584 | 590 | 597 | 603 | 609 | 615 | 621 | 628 | |
| 702 | | 634 | 640 | 646 | 652 | 658 | 665 | 671 | 677 | 683 | 689 | |
| 703 | | 696 | 702 | 708 | 714 | 720 | 726 | 733 | 739 | 745 | 751 | |
| 704 | | 757 | 763 | 770 | 776 | 782 | 788 | 794 | 800 | 807 | 813 | |
| 705 | | 819 | 825 | 831 | 837 | 844 | 850 | 856 | 862 | 868 | 874 | |
| 706 | | 880 | 887 | 893 | 899 | 905 | 911 | 917 | 924 | 930 | 936 | |
| 707 | | 942 | 948 | 954 | 960 | 967 | 973 | 979 | 985 | 991 | 997 | |
| 708 | 85 | 003 | 009 | 016 | 022 | 028 | 034 | 040 | 046 | 052 | 058 | 7 |
| 709 | | 065 | 071 | 077 | 083 | 089 | 095 | 101 | 107 | 114 | 120 | 1 0.7 |
| | | | | | | | | | | | | 2 1.4 |
| | | | | | | | | | | | | 3 2.1 |
| 710 | | 126 | 132 | 138 | 144 | 150 | 156 | 163 | 169 | 175 | 181 | 4 2.8 |
| 711 | | 187 | 193 | 199 | 205 | 211 | 217 | 224 | 230 | 236 | 242 | 5 3.5 |
| 712 | | 248 | 254 | 260 | 266 | 272 | 278 | 285 | 291 | 297 | 303 | 6 4.2 |
| 713 | | 309 | 315 | 321 | 327 | 333 | 339 | 345 | 352 | 358 | 364 | 7 4.9 |
| 714 | | 370 | 376 | 382 | 388 | 394 | 400 | 406 | 412 | 418 | 425 | 8 5.6 |
| 715 | | 431 | 437 | 443 | 449 | 455 | 461 | 467 | 473 | 479 | 485 | 9 6.3 |
| 716 | | 491 | 497 | 503 | 509 | 516 | 522 | 528 | 534 | 540 | 546 | |
| 717 | | 552 | 558 | 564 | 570 | 576 | 582 | 588 | 594 | 600 | 606 | |
| 718 | | 612 | 618 | 625 | 631 | 637 | 643 | 649 | 655 | 661 | 667 | |
| 719 | | 673 | 679 | 685 | 691 | 697 | 703 | 709 | 715 | 721 | 727 | |
| 720 | | 733 | 739 | 745 | 751 | 757 | 763 | 769 | 775 | 781 | 788 | 6 |
| 721 | | 794 | 800 | 806 | 812 | 818 | 824 | 830 | 836 | 842 | 848 | 1 0.6 |
| 722 | | 854 | 860 | 866 | 872 | 878 | 884 | 890 | 896 | 902 | 908 | 2 1.2 |
| 723 | | 914 | 920 | 926 | 932 | 938 | 944 | 950 | 956 | 962 | 968 | 3 1.8 |
| 724 | | 974 | 980 | 986 | 992 | 998 | *004 | *010 | *016 | *022 | *028 | 4 2.4 |
| 725 | 86 | 034 | 040 | 046 | 052 | 058 | 064 | 070 | 076 | 082 | 088 | 5 3.0 |
| 726 | | 094 | 100 | 106 | 112 | 118 | 124 | 130 | 136 | 141 | 147 | 6 3.6 |
| 727 | | 153 | 159 | 165 | 171 | 177 | 183 | 189 | 195 | 201 | 207 | 7 4.2 |
| 728 | | 213 | 219 | 225 | 231 | 237 | 243 | 249 | 255 | 261 | 267 | 8 4.8 |
| 729 | | 273 | 279 | 285 | 291 | 297 | 303 | 308 | 314 | 320 | 326 | 9 5.4 |
| 730 | | 332 | 338 | 344 | 350 | 356 | 362 | 368 | 374 | 380 | 386 | |
| 731 | | 392 | 398 | 404 | 410 | 415 | 421 | 427 | 433 | 439 | 445 | |
| 732 | | 451 | 457 | 463 | 469 | 475 | 481 | 487 | 493 | 499 | 504 | |
| 733 | | 510 | 516 | 522 | 528 | 534 | 540 | 546 | 552 | 558 | 564 | |
| 734 | | 570 | 576 | 581 | 587 | 593 | 599 | 605 | 611 | 617 | 623 | |
| 735 | | 629 | 635 | 641 | 646 | 652 | 658 | 664 | 670 | 676 | 682 | 5 |
| 736 | | 688 | 694 | 700 | 705 | 711 | 717 | 723 | 729 | 735 | 741 | 1 0.5 |
| 737 | | 747 | 753 | 759 | 764 | 770 | 776 | 782 | 788 | 794 | 800 | 2 1.0 |
| 738 | | 806 | 812 | 817 | 823 | 829 | 835 | 841 | 847 | 853 | 859 | 3 1.5 |
| 739 | | 864 | 870 | 876 | 882 | 888 | 894 | 900 | 906 | 911 | 917 | 4 2.0 |
| 740 | | 923 | 929 | 935 | 941 | 947 | 953 | 958 | 964 | 970 | 976 | 5 2.5 |
| 741 | | 982 | 988 | 994 | 999 | *005 | *011 | *017 | *023 | *029 | *035 | 6 3.0 |
| 742 | 87 | 040 | 046 | 052 | 058 | 064 | 070 | 075 | 081 | 087 | 093 | 7 3.5 |
| 743 | | 099 | 105 | 111 | 116 | 122 | 128 | 134 | 140 | 146 | 151 | 8 4.0 |
| 744 | | 157 | 163 | 169 | 175 | 181 | 186 | 192 | 198 | 204 | 210 | 9 4.5 |
| 745 | | 216 | 221 | 227 | 233 | 239 | 245 | 251 | 256 | 262 | 268 | |
| 746 | | 274 | 280 | 286 | 291 | 297 | 303 | 309 | 315 | 320 | 326 | |
| 747 | | 332 | 338 | 344 | 349 | 355 | 361 | 367 | 373 | 379 | 384 | |
| 748 | | 390 | 396 | 402 | 408 | 413 | 419 | 425 | 431 | 437 | 442 | |
| 749 | | 448 | 454 | 460 | 466 | 471 | 477 | 483 | 489 | 495 | 500 | |
| 750 | | 506 | 512 | 518 | 523 | 529 | 535 | 541 | 547 | 552 | 558 | |
| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |

FIVE-PLACE LOGARITHMS (Continued)

| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts |
|-----|----|-----|-----|-----|------|------|------|------|------|------|--------------------|
| 750 | 87 | 506 | 512 | 518 | 523 | 529 | 535 | 541 | 547 | 552 | 558 |
| 751 | | 564 | 570 | 576 | 581 | 587 | 593 | 599 | 604 | 610 | 616 |
| 752 | | 622 | 628 | 633 | 639 | 645 | 651 | 656 | 662 | 668 | 674 |
| 753 | | 679 | 685 | 691 | 697 | 703 | 708 | 714 | 720 | 726 | 731 |
| 754 | | 737 | 743 | 749 | 754 | 760 | 766 | 772 | 777 | 783 | 789 |
| 755 | | 795 | 800 | 806 | 812 | 818 | 823 | 829 | 835 | 841 | 846 |
| 756 | | 852 | 858 | 864 | 869 | 875 | 881 | 887 | 892 | 898 | 904 |
| 757 | | 910 | 915 | 921 | 927 | 933 | 938 | 944 | 950 | 955 | 961 |
| 758 | | 967 | 973 | 978 | 984 | 990 | 996 | *001 | *007 | *013 | *018 |
| 759 | 88 | 024 | 030 | 036 | 041 | 047 | 053 | 058 | 064 | 070 | 076 |
| 760 | | 081 | 087 | 093 | 098 | 104 | 110 | 116 | 121 | 127 | 133 |
| 761 | | 138 | 144 | 150 | 156 | 161 | 167 | 173 | 178 | 184 | 190 |
| 762 | | 195 | 201 | 207 | 213 | 218 | 224 | 230 | 235 | 241 | 247 |
| 763 | | 252 | 258 | 264 | 270 | 275 | 281 | 287 | 292 | 298 | 304 |
| 764 | | 309 | 315 | 321 | 326 | 332 | 338 | 343 | 349 | 355 | 360 |
| 765 | | 366 | 372 | 377 | 383 | 389 | 395 | 400 | 406 | 412 | 417 |
| 766 | | 423 | 429 | 434 | 440 | 446 | 451 | 457 | 463 | 468 | 474 |
| 767 | | 480 | 485 | 491 | 497 | 502 | 508 | 513 | 519 | 525 | 530 |
| 768 | | 536 | 542 | 547 | 553 | 559 | 564 | 570 | 576 | 581 | 587 |
| 769 | | 593 | 598 | 604 | 610 | 615 | 621 | 627 | 632 | 638 | 643 |
| 770 | | 649 | 655 | 660 | 666 | 672 | 677 | 683 | 689 | 694 | 700 |
| 771 | | 705 | 711 | 717 | 722 | 728 | 734 | 739 | 745 | 750 | 756 |
| 772 | | 762 | 767 | 773 | 779 | 784 | 790 | 795 | 801 | 807 | 812 |
| 773 | | 818 | 824 | 829 | 835 | 840 | 846 | 852 | 857 | 863 | 868 |
| 774 | | 874 | 880 | 885 | 891 | 897 | 902 | 908 | 913 | 919 | 925 |
| 775 | | 930 | 936 | 941 | 947 | 953 | 958 | 964 | 969 | 975 | 981 |
| 776 | | 986 | 992 | 997 | *003 | *009 | *014 | *020 | *025 | *031 | *037 |
| 777 | 89 | 042 | 048 | 053 | 059 | 064 | 070 | 076 | 081 | 087 | 092 |
| 778 | | 098 | 104 | 109 | 115 | 120 | 126 | 131 | 137 | 143 | 148 |
| 779 | | 154 | 159 | 165 | 170 | 176 | 182 | 187 | 193 | 198 | 204 |
| 780 | * | 209 | 215 | 221 | 226 | 232 | 237 | 243 | 248 | 254 | 260 |
| 781 | | 265 | 271 | 276 | 282 | 287 | 293 | 298 | 304 | 310 | 315 |
| 782 | | 321 | 326 | 332 | 337 | 343 | 348 | 354 | 360 | 365 | 371 |
| 783 | | 376 | 382 | 387 | 393 | 398 | 404 | 409 | 415 | 421 | 426 |
| 784 | | 432 | 437 | 443 | 448 | 454 | 459 | 465 | 470 | 476 | 481 |
| 785 | | 487 | 492 | 498 | 504 | 509 | 515 | 520 | 526 | 531 | 537 |
| 786 | | 542 | 548 | 553 | 559 | 564 | 570 | 575 | 581 | 586 | 592 |
| 787 | | 597 | 603 | 609 | 614 | 620 | 625 | 631 | 636 | 642 | 647 |
| 788 | | 653 | 658 | 664 | 669 | 675 | 680 | 686 | 691 | 697 | 702 |
| 789 | | 708 | 713 | 719 | 724 | 730 | 735 | 741 | 746 | 752 | 757 |
| 790 | | 763 | 768 | 774 | 779 | 785 | 790 | 796 | 801 | 807 | 812 |
| 791 | | 818 | 823 | 829 | 834 | 840 | 845 | 851 | 856 | 862 | 867 |
| 792 | | 873 | 878 | 883 | 889 | 894 | 900 | 905 | 911 | 916 | 922 |
| 793 | | 927 | 933 | 938 | 944 | 949 | 955 | 960 | 966 | 971 | 977 |
| 794 | | 982 | 988 | 993 | 998 | *004 | *009 | *015 | *020 | *026 | *031 |
| 795 | 90 | 037 | 042 | 048 | 053 | 059 | 064 | 069 | 075 | 080 | 086 |
| 796 | | 091 | 097 | 102 | 108 | 113 | 119 | 124 | 129 | 135 | 140 |
| 797 | | 146 | 151 | 157 | 162 | 168 | 173 | 179 | 184 | 189 | 195 |
| 798 | | 200 | 206 | 211 | 217 | 222 | 227 | 233 | 238 | 244 | 249 |
| 799 | | 255 | 260 | 266 | 271 | 276 | 282 | 287 | 293 | 298 | 304 |
| 800 | | 309 | 314 | 320 | 325 | 331 | 336 | 342 | 347 | 352 | 358 |
| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts |

FIVE-PLACE LOGARITHMS (Continued)

| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |
|-----|----|-----|-----|-----|-----|-----|-----|-----|------|------|--------------------|---------|
| 800 | 90 | 309 | 314 | 320 | 325 | 331 | 336 | 342 | 347 | 352 | 358 | |
| 801 | | 363 | 369 | 374 | 380 | 385 | 390 | 396 | 401 | 407 | 412 | |
| 802 | | 417 | 423 | 428 | 434 | 439 | 445 | 450 | 455 | 461 | 466 | |
| 803 | | 472 | 477 | 482 | 488 | 493 | 499 | 504 | 509 | 515 | 520 | |
| 804 | | 526 | 531 | 536 | 542 | 547 | 553 | 558 | 563 | 569 | 574 | |
| 805 | | 580 | 585 | 590 | 596 | 601 | 607 | 612 | 617 | 623 | 628 | |
| 806 | | 634 | 639 | 644 | 650 | 655 | 660 | 666 | 671 | 677 | 682 | |
| 807 | | 687 | 693 | 698 | 703 | 709 | 714 | 720 | 725 | 730 | 736 | |
| 808 | | 741 | 747 | 752 | 757 | 763 | 768 | 773 | 779 | 784 | 789 | |
| 809 | | 795 | 800 | 806 | 811 | 816 | 822 | 827 | 832 | 838 | 843 | |
| 810 | | 849 | 854 | 859 | 865 | 870 | 875 | 881 | 886 | 891 | 897 | 6 |
| 811 | | 902 | 907 | 913 | 918 | 924 | 929 | 934 | 940 | 945 | 950 | 1 0.6 |
| 812 | | 956 | 961 | 966 | 972 | 977 | 982 | 988 | 993 | 998 | *004 | 2 1.2 |
| 813 | 91 | 009 | 014 | 020 | 025 | 030 | 036 | 041 | 046 | 052 | 057 | 3 1.8 |
| 814 | | 062 | 068 | 073 | 078 | 084 | 089 | 094 | 100 | 105 | 110 | 4 2.4 |
| 815 | | 116 | 121 | 126 | 132 | 137 | 142 | 148 | 153 | 158 | 164 | 5 3.0 |
| 816 | | 169 | 174 | 180 | 185 | 190 | 196 | 201 | 206 | 212 | 217 | 6 3.6 |
| 817 | | 222 | 228 | 233 | 238 | 243 | 249 | 254 | 259 | 265 | 270 | 7 4.2 |
| 818 | | 275 | 281 | 286 | 291 | 297 | 302 | 307 | 312 | 318 | 323 | 8 4.8 |
| 819 | | 328 | 334 | 339 | 344 | 350 | 355 | 360 | 365 | 371 | 376 | 9 5.4 |
| 820 | | 381 | 387 | 392 | 397 | 403 | 408 | 413 | 418 | 424 | 429 | |
| 821 | | 434 | 440 | 445 | 450 | 455 | 461 | 466 | 471 | 477 | 482 | |
| 822 | | 487 | 492 | 498 | 503 | 508 | 514 | 519 | 524 | 529 | 535 | |
| 823 | | 540 | 545 | 551 | 556 | 561 | 566 | 572 | 577 | 582 | 587 | |
| 824 | | 593 | 598 | 603 | 609 | 614 | 619 | 624 | 630 | 635 | 640 | |
| 825 | | 645 | 651 | 656 | 661 | 666 | 672 | 677 | 682 | 687 | 693 | |
| 826 | | 698 | 703 | 709 | 714 | 719 | 724 | 730 | 735 | 740 | 745 | |
| 827 | | 751 | 756 | 761 | 766 | 772 | 777 | 782 | 787 | 793 | 798 | |
| 828 | | 803 | 808 | 814 | 819 | 824 | 829 | 834 | 840 | 845 | 850 | |
| 829 | | 855 | 861 | 866 | 871 | 876 | 882 | 887 | 892 | 897 | 903 | |
| 830 | | 908 | 913 | 918 | 924 | 929 | 934 | 939 | 944 | 950 | 955 | 5 |
| 831 | | 960 | 965 | 971 | 976 | 981 | 986 | 991 | 997 | *002 | *007 | 1 0.5 |
| 832 | 92 | 012 | 018 | 023 | 028 | 033 | 038 | 044 | 049 | 054 | 059 | 2 1.0 |
| 833 | | 065 | 070 | 075 | 080 | 085 | 091 | 096 | 101 | 106 | 111 | 3 1.5 |
| 834 | | 117 | 122 | 127 | 132 | 137 | 143 | 148 | 153 | 158 | 163 | 4 2.0 |
| 835 | | 169 | 174 | 179 | 184 | 189 | 195 | 200 | 205 | 210 | 215 | 5 2.5 |
| 836 | | 221 | 226 | 231 | 236 | 241 | 247 | 252 | 257 | 262 | 267 | 6 3.0 |
| 837 | | 273 | 278 | 283 | 288 | 293 | 298 | 304 | 309 | 314 | 319 | 7 3.5 |
| 838 | | 324 | 330 | 335 | 340 | 345 | 350 | 355 | 361 | 366 | 371 | 8 4.0 |
| 839 | | 376 | 381 | 387 | 392 | 397 | 402 | 407 | 412 | 418 | 423 | 9 4.5 |
| 840 | | 428 | 433 | 438 | 443 | 449 | 454 | 459 | 464 | 469 | 474 | |
| 841 | | 480 | 485 | 490 | 495 | 500 | 505 | 511 | 516 | 521 | 526 | |
| 842 | | 531 | 536 | 542 | 547 | 552 | 557 | 562 | 567 | 572 | 578 | |
| 843 | | 583 | 588 | 593 | 598 | 603 | 609 | 614 | 619 | 624 | 629 | |
| 844 | | 634 | 639 | 645 | 650 | 655 | 660 | 665 | 670 | 675 | 681 | |
| 845 | | 686 | 691 | 696 | 701 | 706 | 711 | 716 | 722 | 727 | 732 | |
| 846 | | 737 | 742 | 747 | 752 | 758 | 763 | 768 | 773 | 778 | 783 | |
| 847 | | 788 | 793 | 799 | 804 | 809 | 814 | 819 | 824 | 829 | 834 | |
| 848 | | 840 | 845 | 850 | 855 | 860 | 865 | 870 | 875 | 881 | 886 | |
| 849 | | 891 | 896 | 901 | 906 | 911 | 916 | 921 | 927 | 932 | 937 | |
| 850 | | 942 | 947 | 952 | 957 | 962 | 967 | 973 | *978 | 983 | 988 | |
| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |

FIVE-PLACE LOGARITHMS (Continued)

| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |
|-----|----|-----|-----|------|------|------|------|------|------|------|--------------------|-------|
| 850 | 92 | 942 | 947 | 952 | 957 | 962 | 967 | 973 | 978 | 983 | 988 | |
| 851 | | 993 | 998 | *003 | *008 | *013 | *018 | *024 | *029 | *034 | *039 | |
| 852 | 93 | 044 | 049 | 054 | 059 | 064 | 069 | 075 | 080 | 085 | 090 | |
| 853 | | 095 | 100 | 105 | 110 | 115 | 120 | 125 | 131 | 136 | 141 | |
| 854 | | 146 | 151 | 156 | 161 | 166 | 171 | 176 | 181 | 186 | 192 | |
| 855 | | 197 | 202 | 207 | 212 | 217 | 222 | 227 | 232 | 237 | 242 | |
| 856 | | 247 | 252 | 258 | 263 | 268 | 273 | 278 | 283 | 288 | 293 | 5 |
| 857 | | 298 | 303 | 308 | 313 | 318 | 323 | 328 | 334 | 339 | 344 | 1 0.6 |
| 858 | | 349 | 354 | 359 | 364 | 369 | 374 | 379 | 384 | 389 | 394 | 2 1.2 |
| 859 | | 399 | 404 | 409 | 414 | 420 | 425 | 430 | 435 | 440 | 445 | 3 1.8 |
| | | | | | | | | | | | | 4 2.4 |
| 860 | | 450 | 455 | 460 | 465 | 470 | 475 | 480 | 485 | 490 | 495 | 5 3.0 |
| 861 | | 500 | 505 | 510 | 515 | 520 | 526 | 531 | 536 | 541 | 546 | 6 3.6 |
| 862 | | 551 | 556 | 561 | 566 | 571 | 576 | 581 | 586 | 591 | 596 | 7 4.2 |
| 863 | | 601 | 606 | 611 | 616 | 621 | 626 | 631 | 636 | 641 | 646 | 8 4.8 |
| 864 | | 651 | 656 | 661 | 666 | 671 | 676 | 682 | 687 | 692 | 697 | 9 5.4 |
| 865 | | 702 | 707 | 712 | 717 | 722 | 727 | 732 | 737 | 742 | 747 | |
| 866 | | 752 | 757 | 762 | 767 | 772 | 777 | 782 | 787 | 792 | 797 | |
| 867 | | 802 | 807 | 812 | 817 | 822 | 827 | 832 | 837 | 842 | 847 | |
| 868 | | 852 | 857 | 862 | 867 | 872 | 877 | 882 | 887 | 892 | 897 | |
| 869 | | 902 | 907 | 912 | 917 | 922 | 927 | 932 | 937 | 942 | 947 | |
| | | | | | | | | | | | | 5 |
| 870 | | 952 | 957 | 962 | 967 | 972 | 977 | 982 | 987 | 992 | 997 | 1 0.5 |
| 871 | 94 | 002 | 007 | 012 | 017 | 022 | 027 | 032 | 037 | 042 | 047 | 2 1.0 |
| 872 | | 052 | 057 | 062 | 067 | 072 | 077 | 082 | 086 | 091 | 096 | 3 1.5 |
| 873 | | 101 | 106 | 111 | 116 | 121 | 126 | 131 | 136 | 141 | 146 | 4 2.0 |
| 874 | | 151 | 156 | 161 | 166 | 171 | 176 | 181 | 186 | 191 | 196 | 5 2.5 |
| 875 | | 201 | 206 | 211 | 216 | 221 | 226 | 231 | 236 | 240 | 245 | 6 3.0 |
| 876 | | 250 | 255 | 260 | 265 | 270 | 275 | 280 | 285 | 290 | 295 | 7 3.5 |
| 877 | | 300 | 305 | 310 | 315 | 320 | 325 | 330 | 335 | 340 | 345 | 8 4.0 |
| 878 | | 349 | 354 | 359 | 364 | 369 | 374 | 379 | 384 | 389 | 394 | 9 4.5 |
| 879 | | 399 | 404 | 409 | 414 | 419 | 424 | 429 | 433 | 438 | 443 | |
| | | | | | | | | | | | | 4 |
| 880 | | 448 | 453 | 458 | 463 | 468 | 473 | 478 | 483 | 488 | 493 | 1 0.4 |
| 881 | | 498 | 503 | 507 | 512 | 517 | 522 | 527 | 532 | 537 | 542 | 2 0.8 |
| 882 | | 547 | 552 | 557 | 562 | 567 | 571 | 576 | 581 | 586 | 591 | 3 1.2 |
| 883 | | 596 | 601 | 606 | 611 | 616 | 621 | 626 | 630 | 635 | 640 | 4 1.6 |
| 884 | | 645 | 650 | 655 | 660 | 665 | 670 | 675 | 680 | 685 | 689 | 5 2.0 |
| 885 | | 694 | 699 | 704 | 709 | 714 | 719 | 724 | 729 | 734 | 738 | 6 2.4 |
| 886 | | 743 | 748 | 753 | 758 | 763 | 768 | 773 | 778 | 783 | 787 | 7 2.8 |
| 887 | | 792 | 797 | 802 | 807 | 812 | 817 | 822 | 827 | 832 | 836 | 8 3.2 |
| 888 | | 841 | 846 | 851 | 856 | 861 | 866 | 871 | 876 | 880 | 885 | 9 3.6 |
| 889 | | 890 | 895 | 900 | 905 | 910 | 915 | 919 | 924 | 929 | 934 | |
| | | | | | | | | | | | | |
| 890 | | 939 | 944 | 949 | 954 | 959 | 963 | 968 | 973 | 978 | 983 | |
| 891 | | 988 | 993 | 998 | *002 | *007 | *012 | *017 | *022 | *027 | *032 | |
| 892 | 95 | 036 | 041 | 046 | 051 | 056 | 061 | 066 | 071 | 075 | 080 | |
| 893 | | 085 | 090 | 095 | 100 | 105 | 109 | 114 | 119 | 124 | 129 | |
| 894 | | 134 | 139 | 143 | 148 | 153 | 158 | 163 | 168 | 173 | 177 | |
| 895 | | 182 | 187 | 192 | 197 | 202 | 207 | 211 | 216 | 221 | 226 | |
| 896 | | 231 | 236 | 240 | 245 | 250 | 255 | 260 | 265 | 270 | 274 | |
| 897 | | 279 | 284 | 289 | 294 | 299 | 303 | 308 | 313 | 318 | 323 | |
| 898 | | 328 | 332 | 337 | 342 | 347 | 352 | 357 | 361 | 366 | 371 | |
| 899 | | 376 | 381 | 386 | 390 | 395 | 400 | 405 | 410 | 415 | 419 | |
| | | | | | | | | | | | | |
| 900 | | 424 | 429 | 434 | 439 | 444 | 448 | 453 | 458 | 463 | 468 | |
| | | | | | | | | | | | | |
| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |

FIVE-PLACE LOGARITHMS (Continued)

| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |
|-----|----|-----|------|------|------|------|------|------|------|------|--------------------|-------|
| 900 | 95 | 424 | 429 | 434 | 439 | 444 | 448 | 453 | 458 | 463 | 468 | |
| 901 | | 472 | 477 | 482 | 487 | 492 | 497 | 501 | 506 | 511 | 516 | |
| 902 | | 521 | 525 | 530 | 535 | 540 | 545 | 550 | 554 | 559 | 564 | |
| 903 | | 569 | 574 | 578 | 583 | 588 | 593 | 598 | 602 | 607 | 612 | |
| 904 | | 617 | 622 | 626 | 631 | 636 | 641 | 646 | 650 | 655 | 660 | |
| 905 | | 665 | 670 | 674 | 679 | 684 | 689 | 694 | 698 | 703 | 708 | |
| 906 | | 713 | 718 | 722 | 727 | 732 | 737 | 742 | 746 | 751 | 756 | |
| 907 | | 761 | 766 | 770 | 775 | 780 | 785 | 789 | 794 | 799 | 804 | |
| 908 | | 809 | 813 | 818 | 823 | 828 | 832 | 837 | 842 | 847 | 852 | |
| 909 | | 856 | 861 | 866 | 871 | 875 | 880 | 885 | 890 | 895 | 899 | |
| 910 | | 904 | 909 | 914 | 918 | 923 | 928 | 933 | 938 | 942 | 947 | 5 |
| 911 | | 952 | 957 | 961 | 966 | 971 | 976 | 980 | 985 | 990 | 995 | 1 0.5 |
| 912 | | 999 | *004 | *009 | *014 | *019 | *023 | *028 | *033 | *038 | *042 | 2 1.0 |
| 913 | 96 | 047 | 052 | 057 | 061 | 066 | 071 | 076 | 080 | 085 | 090 | 3 1.5 |
| 914 | | 095 | 099 | 104 | 109 | 114 | 118 | 123 | 128 | 133 | 137 | 4 2.0 |
| 915 | | 142 | 147 | 152 | 156 | 161 | 166 | 171 | 175 | 180 | 185 | 5 2.5 |
| 916 | | 190 | 194 | 199 | 204 | 209 | 213 | 218 | 223 | 227 | 232 | 6 3.0 |
| 917 | | 237 | 242 | 246 | 251 | 256 | 261 | 265 | 270 | 275 | 280 | 7 3.5 |
| 918 | | 284 | 289 | 294 | 298 | 303 | 308 | 313 | 317 | 322 | 327 | 8 4.0 |
| 919 | | 332 | 336 | 341 | 346 | 350 | 355 | 360 | 365 | 369 | 374 | 9 4.5 |
| 920 | | 379 | 384 | 388 | 393 | 398 | 402 | 407 | 412 | 417 | 421 | |
| 921 | | 426 | 431 | 435 | 440 | 445 | 450 | 454 | 459 | 464 | 468 | |
| 922 | | 473 | 478 | 483 | 487 | 492 | 497 | 501 | 506 | 511 | 515 | |
| 923 | | 520 | 525 | 530 | 534 | 539 | 544 | 548 | 553 | 558 | 562 | |
| 924 | | 567 | 572 | 577 | 581 | 586 | 591 | 595 | 600 | 605 | 609 | |
| 925 | | 614 | 619 | 624 | 628 | 633 | 638 | 642 | 647 | 652 | 656 | |
| 926 | | 661 | 666 | 670 | 675 | 680 | 685 | 689 | 694 | 699 | 703 | |
| 927 | | 708 | 713 | 717 | 722 | 727 | 731 | 736 | 741 | 745 | 750 | |
| 928 | | 755 | 759 | 764 | 769 | 774 | 778 | 783 | 788 | 792 | 797 | |
| 929 | | 802 | 806 | 811 | 816 | 820 | 825 | 830 | 834 | 839 | 844 | |
| 930 | | 848 | 853 | 858 | 862 | 867 | 872 | 876 | 881 | 886 | 890 | 4 |
| 931 | | 895 | 900 | 904 | 909 | 914 | 918 | 923 | 928 | 932 | 937 | 1 0.4 |
| 932 | | 942 | 946 | 951 | 956 | 960 | 965 | 970 | 974 | 979 | 984 | 2 0.8 |
| 933 | | 988 | 993 | 997 | *002 | *007 | *011 | *016 | *021 | *025 | *030 | 3 1.2 |
| 934 | 97 | 035 | 039 | 044 | 049 | 053 | 058 | 063 | 067 | 072 | 077 | 4 1.6 |
| 935 | | 081 | 086 | 090 | 095 | 100 | 104 | 109 | 114 | 118 | 123 | 5 2.0 |
| 936 | | 128 | 132 | 137 | 142 | 146 | 151 | 155 | 160 | 165 | 169 | 6 2.4 |
| 937 | | 174 | 179 | 183 | 188 | 192 | 197 | 202 | 206 | 211 | 216 | 7 2.8 |
| 938 | | 220 | 225 | 230 | 234 | 239 | 243 | 248 | 253 | 257 | 262 | 8 3.2 |
| 939 | | 267 | 271 | 276 | 280 | 285 | 290 | 294 | 299 | 304 | 308 | 9 3.6 |
| 940 | | 313 | 317 | 322 | 327 | 331 | 336 | 340 | 345 | 350 | 354 | |
| 941 | | 359 | 364 | 368 | 373 | 377 | 382 | 387 | 391 | 396 | 400 | |
| 942 | | 405 | 410 | 414 | 419 | 424 | 428 | 433 | 437 | 442 | 447 | |
| 943 | | 451 | 456 | 460 | 465 | 470 | 474 | 479 | 483 | 488 | 493 | |
| 944 | | 497 | 502 | 506 | 511 | 516 | 520 | 525 | 529 | 534 | 539 | |
| 945 | | 543 | 548 | 552 | 557 | 562 | 566 | 571 | 575 | 580 | 585 | |
| 946 | | 589 | 594 | 598 | 603 | 607 | 612 | 617 | 621 | 626 | 630 | |
| 947 | | 635 | 640 | 644 | 649 | 653 | 658 | 663 | 667 | 672 | 676 | |
| 948 | | 681 | 685 | 690 | 695 | 699 | 704 | 708 | 713 | 717 | 722 | |
| 949 | | 727 | 731 | 736 | 740 | 745 | 749 | 754 | 759 | 763 | 768 | |
| 950 | | 772 | 777 | 782 | 786 | 791 | 795 | 800 | 804 | 809 | 813 | |
| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |

FIVE-PLACE LOGARITHMS (Continued)

| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |
|------|----|-----|-----|-----|------|------|------|------|------|------|--------------------|-------|
| 950 | 97 | 772 | 777 | 782 | 786 | 791 | 795 | 800 | 804 | 809 | 813 | |
| 951 | | 818 | 823 | 827 | 832 | 836 | 841 | 845 | 850 | 855 | 859 | |
| 952 | | 864 | 868 | 873 | 877 | 882 | 886 | 891 | 896 | 900 | 905 | |
| 953 | | 909 | 914 | 918 | 923 | 928 | 932 | 937 | 941 | 946 | 950 | |
| 954 | | 955 | 959 | 964 | 968 | 973 | 978 | 982 | 987 | 991 | 996 | |
| 955 | 98 | 000 | 005 | 009 | 014 | 019 | 023 | 028 | 032 | 037 | 041 | |
| 956 | | 046 | 050 | 055 | 059 | 064 | 068 | 073 | 078 | 082 | 087 | |
| 957 | | 091 | 096 | 100 | 105 | 109 | 114 | 118 | 123 | 127 | 132 | |
| 958 | | 137 | 141 | 146 | 150 | 155 | 159 | 164 | 168 | 173 | 177 | |
| 959 | | 182 | 186 | 191 | 195 | 200 | 204 | 209 | 214 | 218 | 223 | |
| 960 | | 227 | 232 | 236 | 241 | 245 | 250 | 254 | 259 | 263 | 268 | 5 |
| 961 | | 272 | 277 | 281 | 286 | 290 | 295 | 299 | 304 | 308 | 313 | 1 0.5 |
| 962 | | 318 | 322 | 327 | 331 | 336 | 340 | 345 | 349 | 354 | 358 | 2 1.0 |
| 963 | | 363 | 367 | 372 | 376 | 381 | 385 | 390 | 394 | 399 | 403 | 3 1.5 |
| 964 | | 408 | 412 | 417 | 421 | 426 | 430 | 435 | 439 | 444 | 448 | 4 2.0 |
| 965 | | 453 | 457 | 462 | 466 | 471 | 475 | 480 | 484 | 489 | 493 | 5 2.5 |
| 966 | | 498 | 502 | 507 | 511 | 516 | 520 | 525 | 529 | 534 | 538 | 6 3.0 |
| 967 | | 543 | 547 | 552 | 556 | 561 | 565 | 570 | 574 | 579 | 583 | 7 3.5 |
| 968 | | 588 | 592 | 597 | 601 | 605 | 610 | 614 | 619 | 623 | 628 | 8 4.0 |
| 969 | | 632 | 637 | 641 | 646 | 650 | 655 | 659 | 664 | 668 | 673 | 9 4.5 |
| 970 | | 677 | 682 | 686 | 691 | 695 | 700 | 704 | 709 | 713 | 717 | |
| 971 | | 722 | 726 | 731 | 735 | 740 | 744 | 749 | 753 | 758 | 762 | |
| 972 | | 767 | 771 | 776 | 780 | 784 | 789 | 793 | 798 | 802 | 807 | |
| 973 | | 811 | 816 | 820 | 825 | 829 | 834 | 838 | 843 | 847 | 851 | |
| 974 | | 856 | 860 | 865 | 869 | 874 | 878 | 883 | 887 | 892 | 896 | |
| 975 | | 900 | 905 | 909 | 914 | 918 | 923 | 927 | 932 | 936 | 941 | |
| 976 | | 945 | 949 | 954 | 958 | 963 | 967 | 972 | 976 | 981 | 985 | |
| 977 | | 989 | 994 | 998 | *003 | *007 | *012 | *016 | *021 | *025 | *029 | |
| 978 | 99 | 034 | 038 | 043 | 047 | 052 | 056 | 061 | 065 | 069 | 074 | |
| 979 | | 078 | 083 | 087 | 092 | 096 | 100 | 105 | 109 | 114 | 118 | |
| 980 | | 123 | 127 | 131 | 136 | 140 | 145 | 149 | 154 | 158 | 162 | 4 |
| 981 | | 167 | 171 | 176 | 180 | 185 | 189 | 193 | 198 | 202 | 207 | 1 0.4 |
| 982 | | 211 | 216 | 220 | 224 | 229 | 233 | 238 | 242 | 247 | 251 | 2 0.8 |
| 983 | | 255 | 260 | 264 | 269 | 273 | 277 | 282 | 286 | 291 | 295 | 3 1.2 |
| 984 | | 300 | 304 | 308 | 313 | 317 | 322 | 326 | 330 | 335 | 339 | 4 1.6 |
| 985 | | 344 | 348 | 352 | 357 | 361 | 366 | 370 | 374 | 379 | 383 | 5 2.0 |
| 986 | | 388 | 392 | 396 | 401 | 405 | 410 | 414 | 419 | 423 | 427 | 6 2.4 |
| 987 | | 432 | 436 | 441 | 445 | 449 | 454 | 458 | 463 | 467 | 471 | 7 2.8 |
| 988 | | 476 | 480 | 484 | 489 | 493 | 498 | 502 | 506 | 511 | 515 | 8 3.2 |
| 989 | | 520 | 524 | 528 | 533 | 537 | 542 | 546 | 550 | 555 | 559 | 9 3.6 |
| 990 | | 564 | 568 | 572 | 577 | 581 | 585 | 590 | 594 | 599 | 603 | |
| 991 | | 607 | 612 | 616 | 621 | 625 | 629 | 634 | 638 | 642 | 647 | |
| 992 | | 651 | 656 | 660 | 664 | 669 | 673 | 677 | 682 | 686 | 691 | |
| 993 | | 695 | 699 | 704 | 708 | 712 | 717 | 721 | 726 | 730 | 734 | |
| 994 | | 739 | 743 | 747 | 752 | 756 | 760 | 765 | 769 | 774 | 778 | |
| 995 | | 782 | 787 | 791 | 795 | 800 | 804 | 808 | 813 | 817 | 822 | |
| 996 | | 826 | 830 | 835 | 839 | 843 | 848 | 852 | 856 | 861 | 865 | |
| 997 | | 870 | 874 | 878 | 883 | 887 | 891 | 896 | 900 | 904 | 909 | |
| 998 | | 913 | 917 | 922 | 926 | 930 | 935 | 939 | 944 | 948 | 952 | |
| 999 | | 957 | 961 | 965 | 970 | 974 | 978 | 983 | 987 | 991 | 996 | |
| 1000 | 00 | 000 | 004 | 009 | 013 | 017 | 022 | 026 | 030 | 035 | 039 | |
| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional parts | |

LOGARITHMS (Continued)

| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | d. | |
|------|-----|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
| 1000 | 000 | 0000 | 0434 | 0869 | 1303 | 1737 | 2171 | 2605 | 3039 | 3473 | 3907 | 434 |
| 1001 | | 4341 | 4775 | 5208 | 5642 | 6076 | 6510 | 6943 | 7377 | 7810 | 8244 | 434 |
| 1002 | | 8677 | 9111 | 9544 | 9977 | *0411 | *0844 | *1277 | *1710 | *2143 | *2576 | 433 |
| 1003 | 001 | 3009 | 3442 | 3875 | 4308 | 4741 | 5174 | 5607 | 6039 | 6472 | 6905 | 433 |
| 1004 | | 7337 | 7770 | 8202 | 8635 | 9067 | 9499 | 9932 | *0364 | *0796 | *1228 | 432 |
| 1005 | 002 | 1661 | 2093 | 2525 | 2957 | 3389 | 3821 | 4253 | 4685 | 5116 | 5548 | 432 |
| 1006 | | 5980 | 6411 | 6843 | 7275 | 7706 | 8138 | 8569 | 9001 | 9432 | 9863 | 431 |
| 1007 | 003 | 0295 | 0726 | 1157 | 1588 | 2019 | 2451 | 2882 | 3313 | 3744 | 4174 | 431 |
| 1008 | | 4605 | 5036 | 5467 | 5898 | 6328 | 6759 | 7190 | 7620 | 8051 | 8481 | 431 |
| 1009 | | 8912 | 9342 | 9772 | *0203 | *0633 | *1063 | *1493 | *1924 | *2354 | *2784 | 430 |
| 1010 | 004 | 3214 | 3644 | 4074 | 4504 | 4933 | 5363 | 5793 | 6223 | 6652 | 7082 | 430 |
| 1011 | | 7512 | 7941 | 8371 | 8800 | 9229 | 9659 | *0088 | *0517 | *0947 | *1376 | 429 |
| 1012 | 005 | 1805 | 2234 | 2663 | 3092 | 3521 | 3950 | 4379 | 4808 | 5237 | 5666 | 429 |
| 1013 | | 6094 | 6523 | 6952 | 7380 | 7809 | 8238 | 8666 | 9094 | 9523 | 9951 | 429 |
| 1014 | 006 | 0380 | 0808 | 1236 | 1664 | 2092 | 2521 | 2949 | 3377 | 3805 | 4233 | 428 |
| 1015 | | 4660 | 5088 | 5516 | 5944 | 6372 | 6799 | 7227 | 7655 | 8082 | 8510 | 428 |
| 1016 | | 8937 | 9365 | 9792 | *0219 | *0647 | *1074 | *1501 | *1923 | *2355 | *2782 | 427 |
| 1017 | 007 | 3210 | 3637 | 4064 | 4490 | 4917 | 5344 | 5771 | 6198 | 6624 | 7051 | 427 |
| 1018 | | 7478 | 7904 | 8331 | 8757 | 9184 | 9610 | *0037 | *0463 | *0889 | *1316 | 426 |
| 1019 | 008 | 1742 | 2168 | 2594 | 3020 | 3446 | 3872 | 4298 | 4724 | 5150 | 5576 | 426 |
| 1020 | | 6002 | 6427 | 6853 | 7279 | 7704 | 8130 | 8556 | 8981 | 9407 | 9832 | 426 |
| 1021 | 009 | 0257 | 0683 | 1108 | 1533 | 1959 | 2384 | 2809 | 3234 | 3659 | 4084 | 425 |
| 1022 | | 4509 | 4934 | 5359 | 5784 | 6208 | 6633 | 7058 | 7483 | 7907 | 8332 | 425 |
| 1023 | | 8756 | 9181 | 9605 | *0030 | *0454 | *0878 | *1303 | *1727 | *2151 | *2575 | 424 |
| 1024 | 010 | 3000 | 3424 | 3848 | 4272 | 4696 | 5120 | 5544 | 5967 | 6391 | 6815 | 424 |
| 1025 | | 7239 | 7662 | 8086 | 8510 | 8933 | 9357 | 9780 | *0204 | *0627 | *1050 | 424 |
| 1026 | 011 | 1474 | 1897 | 2320 | 2743 | 3166 | 3590 | 4013 | 4436 | 4859 | 5282 | 423 |
| 1027 | | 5704 | 6127 | 6550 | 6973 | 7396 | 7818 | 8241 | 8664 | 9086 | 9509 | 423 |
| 1028 | | 9931 | *0354 | *0776 | *1198 | *1621 | *2043 | *2465 | *2887 | *3310 | *3732 | 422 |
| 1029 | 012 | 4154 | 4576 | 4998 | 5420 | 5842 | 6264 | 6685 | 7107 | 7529 | 7951 | 422 |
| 1030 | | 8372 | 8794 | 9215 | 9637 | *0059 | *0480 | *0901 | *1323 | *1744 | *2165 | 422 |
| 1031 | 013 | 2587 | 3008 | 3429 | 3850 | 4271 | 4692 | 5113 | 5534 | 5955 | 6376 | 421 |
| 1032 | | 6797 | 7218 | 7639 | 8059 | 8480 | 8901 | 9321 | 9742 | *0162 | *0583 | 421 |
| 1033 | 014 | 1003 | 1424 | 1844 | 2264 | 2685 | 3105 | 3525 | 3945 | 4365 | 4785 | 420 |
| 1034 | | 5265 | 5625 | 6045 | 6465 | 6885 | 7305 | 7725 | 8144 | 8564 | 8984 | 420 |
| 1035 | | 9403 | 9823 | *0243 | *0662 | *1082 | *1501 | *1920 | *2340 | *2759 | *3178 | 420 |
| 1036 | 015 | 3598 | 4017 | 4436 | 4855 | 5274 | 5693 | 6112 | 6531 | 6950 | 7369 | 419 |
| 1037 | | 7788 | 8206 | 8625 | 9044 | 9462 | 9881 | *0300 | *0718 | *1137 | *1555 | 419 |
| 1038 | 016 | 1974 | 2392 | 2810 | 3229 | 3647 | 4065 | 4483 | 4901 | 5319 | 5737 | 418 |
| 1039 | | 6155 | 6573 | 6991 | 7409 | 7827 | 8245 | 8663 | 9080 | 9498 | 9916 | 418 |
| 1040 | 017 | 0333 | 0751 | 1168 | 1586 | 2003 | 2421 | 2838 | 3256 | 3673 | 4090 | 417 |
| 1041 | | 4507 | 4924 | 5342 | 5759 | 6176 | 6593 | 7010 | 7427 | 7844 | 8260 | 417 |
| 1042 | | 8677 | 9094 | 9511 | 9927 | *0344 | *0761 | *1177 | *1594 | *2010 | *2427 | 417 |
| 1043 | 018 | 2843 | 3259 | 3676 | 4092 | 4508 | 4925 | 5341 | 5757 | 6173 | 6589 | 416 |
| 1044 | | 7005 | 7421 | 7837 | 8253 | 8669 | 9084 | 9500 | 9916 | *0332 | *0747 | 416 |
| 1045 | 019 | 1163 | 1578 | 1994 | 2410 | 2825 | 3240 | 3656 | 4071 | 4486 | 4902 | 415 |
| 1046 | | 5317 | 5732 | 6147 | 6562 | 6977 | 7392 | 7807 | 8222 | 8637 | 9052 | 415 |
| 1047 | | 9467 | 9882 | *0296 | *0711 | *1126 | *1540 | *1955 | *2369 | *2784 | *3198 | 415 |
| 1048 | 020 | 3613 | 4027 | 4442 | 4856 | 5270 | 5684 | 6099 | 6513 | 6927 | 7341 | 414 |
| 1049 | | 7755 | 8169 | 8583 | 8997 | 9411 | 9824 | *0238 | *0652 | *1066 | *1479 | 414 |
| 1050 | 021 | 1893 | 2307 | 2720 | 3134 | 3547 | 3961 | 4374 | 4787 | 5201 | 5614 | 413 |
| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | d. | |

LOGARITHMS (Continued)

| N. | | 0 | 1 | 2 | 3 | 4 | | 5 | 6 | 7 | 8 | 9 | d. |
|------|-----|------|-------|-------|-------|-------|--|-------|-------|-------|-------|-------|-----|
| 1050 | 021 | 1893 | 2307 | 2720 | 3134 | 3547 | | 3961 | 4374 | 4787 | 5201 | 5614 | 413 |
| 1051 | | 6027 | 6440 | 6854 | 7267 | 7680 | | 8093 | 8506 | 8919 | 9332 | 9745 | 413 |
| 1052 | 022 | 0157 | 0570 | 0983 | 1396 | 1808 | | 2221 | 2634 | 3046 | 3459 | 3871 | 413 |
| 1053 | | 4284 | 4696 | 5109 | 5521 | 5933 | | 6345 | 6758 | 7170 | 7582 | 7994 | 412 |
| 1054 | | 8406 | 8818 | 9230 | 9642 | *0054 | | *0466 | *0878 | *1289 | *1701 | *2113 | 412 |
| 1055 | 023 | 2525 | 2936 | 3348 | 3759 | 4171 | | 4582 | 4994 | 5405 | 5817 | 6228 | 411 |
| 1056 | | 6639 | 7050 | 7462 | 7873 | 8284 | | 8695 | 9106 | 9517 | 9928 | *0339 | 411 |
| 1057 | 024 | 0750 | 1161 | 1572 | 1982 | 2393 | | 2804 | 3214 | 3625 | 4036 | 4446 | 411 |
| 1058 | | 4857 | 5267 | 5678 | 6088 | 6498 | | 6909 | 7319 | 7729 | 8139 | 8549 | 410 |
| 1059 | | 8960 | 9370 | 9780 | *0190 | *0600 | | *1010 | *1419 | *1829 | *2239 | *2649 | 410 |
| 1060 | 025 | 3059 | 3468 | 3878 | 4288 | 4697 | | 5107 | 5516 | 5926 | 6335 | 6744 | 410 |
| 1061 | | 7154 | 7563 | 7972 | 8382 | 8791 | | 9200 | 9609 | *0018 | *0427 | *0836 | 409 |
| 1062 | 026 | 1245 | 1654 | 2063 | 2472 | 2881 | | 3289 | 3698 | 4107 | 4515 | 4924 | 409 |
| 1063 | | 5333 | 5741 | 6150 | 6558 | 6967 | | 7375 | 7783 | 8192 | 8600 | 9008 | 408 |
| 1064 | | 9416 | 9824 | *0233 | *0641 | *1049 | | *1457 | *1865 | *2273 | *2680 | *3088 | 408 |
| 1065 | 027 | 3496 | 3904 | 4312 | 4719 | 5127 | | 5535 | 5942 | 6350 | 6757 | 7165 | 408 |
| 1066 | | 7572 | 7979 | 8387 | 8794 | 9201 | | 9609 | *0016 | *0423 | *0830 | *1237 | 407 |
| 1067 | 028 | 1644 | 2051 | 2458 | 2865 | 3272 | | 3679 | 4086 | 4492 | 4899 | 5306 | 407 |
| 1068 | | 5713 | 6119 | 6526 | 6932 | 7339 | | 7745 | 8152 | 8558 | 8964 | 9371 | 406 |
| 1069 | | 9777 | *0183 | *0590 | *0996 | *1402 | | *1808 | *2214 | *2620 | *3026 | *3432 | 406 |
| 1070 | 029 | 3838 | 4244 | 4649 | 5055 | 5461 | | 5867 | 6272 | 6678 | 7084 | 7489 | 406 |
| 1071 | | 7895 | 8300 | 8706 | 9111 | 9516 | | 9922 | *0327 | *0732 | *1138 | *1543 | 405 |
| 1072 | 030 | 1948 | 2353 | 2758 | 3163 | 3568 | | 3973 | 4378 | 4783 | 5188 | 5592 | 405 |
| 1073 | | 5997 | 6402 | 6807 | 7211 | 7616 | | 8020 | 8425 | 8830 | 9234 | 9638 | 405 |
| 1074 | 031 | 0043 | 0447 | 0851 | 1256 | 1660 | | 2064 | 2468 | 2872 | 3277 | 3681 | 404 |
| 1075 | | 4085 | 4489 | 4893 | 5296 | 5700 | | 6104 | 6508 | 6912 | 7315 | 7719 | 404 |
| 1076 | | 8123 | 8526 | 8930 | 9333 | 9737 | | *0140 | *0544 | *0947 | *1350 | *1754 | 403 |
| 1077 | 032 | 2157 | 2560 | 2963 | 3367 | 3770 | | 4173 | 4576 | 4979 | 5382 | 5785 | 403 |
| 1078 | | 6188 | 6590 | 6993 | 7396 | 7799 | | 8201 | 8604 | 9007 | 9409 | 9812 | 403 |
| 1079 | 033 | 0214 | 0617 | 1019 | 1422 | 1824 | | 2226 | 2629 | 3031 | 3433 | 3835 | 402 |
| 1080 | | 4238 | 4640 | 5042 | 5444 | 5846 | | 6248 | 6650 | 7052 | 7453 | 7855 | 402 |
| 1081 | | 8257 | 8659 | 9060 | 9462 | 9864 | | *0265 | *0667 | *1068 | *1470 | *1871 | 402 |
| 1082 | 034 | 2273 | 2674 | 3075 | 3477 | 3878 | | 4279 | 4680 | 5081 | 5482 | 5884 | 401 |
| 1083 | | 6285 | 6686 | 7087 | 7487 | 7888 | | 8289 | 8690 | 9091 | 9491 | 9892 | 401 |
| 1084 | 035 | 0293 | 0693 | 1094 | 1495 | 1895 | | 2296 | 2696 | 3096 | 3497 | 3897 | 400 |
| 1085 | | 4297 | 4698 | 5098 | 5498 | 5898 | | 6298 | 6698 | 7098 | 7498 | 7898 | 400 |
| 1086 | | 8298 | 8698 | 9098 | 9498 | 9898 | | *0297 | *0697 | *1097 | *1496 | *1896 | 400 |
| 1087 | 036 | 2295 | 2695 | 3094 | 3494 | 3893 | | 4293 | 4692 | 5091 | 5491 | 5890 | 399 |
| 1088 | | 6289 | 6688 | 7087 | 7486 | 7885 | | 8284 | 8683 | 9082 | 9481 | 9880 | 399 |
| 1089 | 037 | 0279 | 0678 | 1076 | 1475 | 1874 | | 2272 | 2671 | 3070 | 3468 | 3867 | 399 |
| 1090 | | 4265 | 4663 | 5062 | 5460 | 5858 | | 6257 | 6655 | 7053 | 7451 | 7849 | 398 |
| 1091 | | 8248 | 8646 | 9044 | 9442 | 9839 | | *0237 | *0635 | *1033 | *1431 | *1829 | 398 |
| 1092 | 038 | 2226 | 2624 | 3022 | 3419 | 3817 | | 4214 | 4612 | 5009 | 5407 | 5804 | 398 |
| 1093 | | 6202 | 6599 | 6996 | 7393 | 7791 | | 8188 | 8585 | 8982 | 9379 | 9776 | 397 |
| 1094 | 039 | 0173 | 0570 | 0967 | 1364 | 1761 | | 2158 | 2554 | 2951 | 3348 | 3745 | 397 |
| 1095 | | 4141 | 4538 | 4934 | 5331 | 5727 | | 6124 | 6520 | 6917 | 7313 | 7709 | 397 |
| 1096 | | 8106 | 8502 | 8898 | 9294 | 9690 | | *0086 | *0482 | *0878 | *1274 | *1670 | 396 |
| 1097 | 040 | 2066 | 2462 | 2858 | 3254 | 3650 | | 4045 | 4441 | 4837 | 5232 | 5628 | 396 |
| 1098 | | 6023 | 6419 | 6814 | 7210 | 7605 | | 8001 | 8396 | 8791 | 9187 | 9582 | 395 |
| 1099 | | 9977 | *0372 | *0767 | *1162 | *1557 | | *1952 | *2347 | *2742 | *3137 | *3532 | 395 |
| 1100 | 041 | 3927 | 4322 | 4716 | 5111 | 5506 | | 5900 | 6295 | 6690 | 7084 | 7479 | 395 |

| N. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | d. |
|----|---|---|---|---|---|---|---|---|---|---|----|
|----|---|---|---|---|---|---|---|---|---|---|----|

LOGARITHMS—(Continued)

| N | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | d. |
|------|-----|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
| 1100 | 041 | 3927 | 4322 | 4716 | 5111 | 5506 | 5900 | 6295 | 6690 | 7084 | 7479 | 395 |
| 1101 | | 7873 | 8268 | 8662 | 9056 | 9451 | 9845 | *0239 | *0633 | *1028 | *1422 | 394 |
| 1102 | 042 | 1816 | 2210 | 2604 | 2998 | 3392 | 3786 | 4180 | 4574 | 4968 | 5361 | 394 |
| 1103 | | 5755 | 6149 | 6543 | 6936 | 7330 | 7723 | 8117 | 8510 | 8904 | 9297 | 394 |
| 1104 | | 9691 | *0084 | *0477 | *0871 | *1264 | *1657 | *2050 | *2444 | *2837 | *3230 | 393 |
| 1105 | 043 | 3623 | 4016 | 4409 | 4802 | 5195 | 5587 | 5980 | 6373 | 6766 | 7159 | 393 |
| 1106 | | 7551 | 7944 | 8337 | 8729 | 9122 | 9514 | 9907 | *0299 | *0692 | *1084 | 393 |
| 1107 | 044 | 1476 | 1869 | 2261 | 2653 | 3045 | 3437 | 3829 | 4222 | 4614 | 5006 | 392 |
| 1108 | | 5398 | 5790 | 6181 | 6573 | 6965 | 7357 | 7749 | 8140 | 8532 | 8924 | 392 |
| 1109 | | 9315 | 9707 | *0099 | *0490 | *0882 | *1273 | *1664 | *2056 | *2447 | *2839 | 392 |
| 1110 | 045 | 3230 | 3621 | 4012 | 4403 | 4795 | 5186 | 5577 | 5968 | 6359 | 6750 | 391 |
| 1111 | | 7141 | 7531 | 7922 | 8313 | 8704 | 9095 | 9485 | 9876 | *0267 | *0657 | 391 |
| 1112 | 046 | 1048 | 1438 | 1829 | 2219 | 2610 | 3000 | 3391 | 3781 | 4171 | 4561 | 390 |
| 1113 | | 4952 | 5342 | 5732 | 6122 | 6512 | 6902 | 7292 | 7682 | 8072 | 8462 | 390 |
| 1114 | | 8852 | 9242 | 9632 | *0021 | *0411 | *0801 | *1190 | *1580 | *1970 | *2359 | 390 |
| 1115 | 047 | 2749 | 3138 | 3528 | 3917 | 4306 | 4696 | 5085 | 5474 | 5864 | 6253 | 389 |
| 1116 | | 6642 | 7031 | 7420 | 7809 | 8198 | 8587 | 8976 | 9365 | 9754 | *0143 | 389 |
| 1117 | 048 | 0532 | 0921 | 1309 | 1698 | 2087 | 2475 | 2864 | 3253 | 3641 | 4030 | 389 |
| 1118 | | 4418 | 4806 | 5195 | 5583 | 5972 | 6360 | 6748 | 7136 | 7525 | 7913 | 388 |
| 1119 | | 8301 | 8689 | 9077 | 9465 | 9853 | *0241 | *0629 | *1017 | *1405 | *1792 | 388 |
| 1120 | 049 | 2180 | 2568 | 2956 | 3343 | 3731 | 4119 | 4506 | 4894 | 5281 | 5669 | 388 |
| 1121 | | 6056 | 6444 | 6831 | 7218 | 7606 | 7993 | 8380 | 8767 | 9154 | 9541 | 387 |
| 1122 | | 9929 | *0316 | *0703 | *1090 | *1477 | *1863 | *2250 | *2637 | *3024 | *3411 | 387 |
| 1123 | 050 | 3798 | 4184 | 4571 | 4958 | 5344 | 5731 | 6117 | 6504 | 6890 | 7277 | 387 |
| 1124 | | 7663 | 8049 | 8436 | 8822 | 9208 | 9595 | 9981 | *0367 | *0753 | *1139 | 386 |
| 1125 | 051 | 1525 | 1911 | 2297 | 2683 | 3069 | 3455 | 3841 | 4227 | 4612 | 4998 | 386 |
| 1126 | | 5384 | 5770 | 6155 | 6541 | 6926 | 7312 | 7697 | 8083 | 8468 | 8854 | 386 |
| 1127 | | 9239 | 9624 | *0010 | *0395 | *0780 | *1166 | *1551 | *1936 | *2321 | *2706 | 385 |
| 1128 | 052 | 3091 | 3476 | 3861 | 4246 | 4631 | 5016 | 5400 | 5785 | 6170 | 6555 | 385 |
| 1129 | | 6939 | 7324 | 7709 | 8093 | 8478 | 8862 | 9247 | 9631 | *0016 | *0400 | 385 |
| 1130 | 053 | 0784 | 1169 | 1553 | 1937 | 2321 | 2706 | 3090 | 3474 | 3858 | 4242 | 384 |
| 1131 | | 4626 | 5010 | 5394 | 5778 | 6162 | 6546 | 6929 | 7313 | 7697 | 8081 | 384 |
| 1132 | | 8464 | 8848 | 9232 | 9615 | 9999 | *0382 | *0766 | *1149 | *1532 | *1916 | 384 |
| 1133 | 054 | 2299 | 2682 | 3066 | 3449 | 3832 | 4215 | 4598 | 4981 | 5365 | 5748 | 383 |
| 1134 | | 6131 | 6514 | 6896 | 7279 | 7662 | 8045 | 8428 | 8811 | 9193 | 9576 | 383 |
| 1135 | | 9959 | *0341 | *0724 | *1106 | *1489 | *1871 | *2254 | *2636 | *3019 | *3401 | 382 |
| 1136 | 055 | 3783 | 4166 | 4548 | 4930 | 5312 | 5694 | 6077 | 6459 | 6841 | 7223 | 382 |
| 1137 | | 7605 | 7987 | 8369 | 8750 | 9132 | 9514 | 9896 | *0278 | *0659 | *1041 | 382 |
| 1138 | 056 | 1423 | 1804 | 2186 | 2567 | 2949 | 3330 | 3712 | 4093 | 4475 | 4856 | 381 |
| 1139 | | 5237 | 5619 | 6000 | 6381 | 6762 | 7143 | 7524 | 7905 | 8287 | 8668 | 381 |
| 1140 | | 9049 | 9429 | 9810 | *0191 | *0572 | *0953 | *1334 | *1714 | *2095 | *2476 | 381 |
| 1141 | 057 | 2856 | 3237 | 3618 | 3998 | 4379 | 4759 | 5140 | 5520 | 5900 | 6281 | 381 |
| 1142 | | 6661 | 7041 | 7422 | 7802 | 8182 | 8562 | 8942 | 9322 | 9702 | *0082 | 380 |
| 1143 | 058 | 0462 | 0842 | 1222 | 1602 | 1982 | 2362 | 2741 | 3121 | 3501 | 3881 | 380 |
| 1144 | | 4260 | 4640 | 5019 | 5399 | 5778 | 6158 | 6537 | 6917 | 7296 | 7676 | 380 |
| 1145 | | 8055 | 8434 | 8813 | 9193 | 9572 | 9951 | *0330 | *0709 | *1088 | *1467 | 379 |
| 1146 | 059 | 1846 | 2225 | 2604 | 2983 | 3362 | 3741 | 4119 | 4498 | 4877 | 5256 | 379 |
| 1147 | | 5634 | 6013 | 6391 | 6770 | 7148 | 7527 | 7905 | 8284 | 8662 | 9041 | 379 |
| 1148 | | 9419 | 9797 | *0175 | *0554 | *0932 | *1310 | *1688 | *2066 | *2444 | *2822 | 378 |
| 1149 | 060 | 3206 | 3578 | 3956 | 4334 | 4712 | 5090 | 5468 | 5845 | 6223 | 6601 | 378 |
| 1150 | | 6978 | 7356 | 7734 | 8111 | 8489 | 8866 | 9244 | 9621 | 9999 | *0376 | 378 |
| N | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | d. |

LOGARITHMS—(Continued)

| N | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | d. | |
|------|-----|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
| 1150 | 060 | 6978 | 7356 | 7734 | 8111 | 8489 | 8866 | 9244 | 9621 | 9999 | *0376 | 378 |
| 1151 | 061 | 0753 | 1131 | 1508 | 1885 | 2262 | 2639 | 3017 | 3394 | 3771 | 4148 | 377 |
| 1152 | | 4525 | 4902 | 5279 | 5656 | 6032 | 6409 | 6786 | 7163 | 7540 | 7916 | 377 |
| 1153 | | 8293 | 8670 | 9046 | 9423 | 9799 | *0176 | *0552 | *0929 | *1305 | *1682 | 377 |
| 1154 | 062 | 2058 | 2434 | 2811 | 3187 | 3563 | 3939 | 4316 | 4692 | 5068 | 5444 | 376 |
| 1155 | | 5820 | 6196 | 6572 | 6948 | 7324 | 7699 | 8075 | 8451 | 8827 | 9203 | 376 |
| 1156 | | 9578 | 9954 | *0330 | *0705 | *1081 | *1456 | *1832 | *2207 | *2583 | *2958 | 376 |
| 1157 | 063 | 3334 | 3709 | 4084 | 4460 | 4835 | 5210 | 5585 | 5960 | 6335 | 6711 | 375 |
| 1158 | | 7086 | 7461 | 7836 | 8211 | 8585 | 8960 | 9335 | 9710 | *0085 | *0460 | 375 |
| 1159 | 064 | 0834 | 1209 | 1584 | 1958 | 2333 | 2708 | 3082 | 3457 | 3831 | 4205 | 375 |
| 1160 | | 4580 | 4954 | 5329 | 5703 | 6077 | 6451 | 6826 | 7200 | 7574 | 7948 | 374 |
| 1161 | | 8322 | 8696 | 9070 | 9444 | 9818 | *0192 | *0566 | *0940 | *1314 | *1688 | 374 |
| 1162 | 065 | 2061 | 2435 | 2809 | 3182 | 3556 | 3930 | 4303 | 4677 | 5050 | 5424 | 374 |
| 1163 | | 5797 | 6171 | 6544 | 6917 | 7291 | 7664 | 8037 | 8410 | 8784 | 9157 | 373 |
| 1164 | | 9530 | 9903 | *0276 | *0649 | *1022 | *1395 | *1768 | *2141 | *2514 | *2886 | 373 |
| 1165 | 066 | 3259 | 3632 | 4005 | 4377 | 4750 | 5123 | 5495 | 5868 | 6241 | 6613 | 373 |
| 1166 | | 6986 | 7358 | 7730 | 8103 | 8475 | 8847 | 9220 | 9592 | 9964 | *0336 | 372 |
| 1167 | 067 | 0709 | 1081 | 1453 | 1825 | 2197 | 2569 | 2941 | 3313 | 3685 | 4057 | 372 |
| 1168 | | 4428 | 4800 | 5172 | 5544 | 5915 | 6287 | 6659 | 7030 | 7402 | 7774 | 372 |
| 1169 | | 8145 | 8517 | 8888 | 9259 | 9631 | *0002 | *0374 | *0745 | *1116 | *1487 | 371 |
| 1170 | 068 | 1859 | 2230 | 2601 | 2972 | 3343 | 3714 | 4085 | 4456 | 4827 | 5198 | 371 |
| 1171 | | 5569 | 5940 | 6311 | 6681 | 7052 | 7423 | 7794 | 8164 | 8535 | 8906 | 371 |
| 1172 | | 9276 | 9647 | *0017 | *0388 | *0758 | *1129 | *1499 | *1869 | *2240 | *2610 | 370 |
| 1173 | 069 | 2980 | 3350 | 3721 | 4091 | 4461 | 4831 | 5201 | 5571 | 5941 | 6311 | 370 |
| 1174 | | 6681 | 7051 | 7421 | 7791 | 8160 | 8530 | 8900 | 9270 | 9639 | *0009 | 370 |
| 1175 | 070 | 0379 | 0748 | 1118 | 1487 | 1857 | 2226 | 2596 | 2965 | 3335 | 3704 | 369 |
| 1176 | | 4073 | 4442 | 4812 | 5181 | 5550 | 5919 | 6288 | 6658 | 7027 | 7396 | 369 |
| 1177 | | 7765 | 8134 | 8503 | 8871 | 9240 | 9609 | 9978 | *0347 | *0715 | *1084 | 369 |
| 1178 | 071 | 1453 | 1822 | 2190 | 2559 | 2927 | 3296 | 3664 | 4033 | 4401 | 4770 | 369 |
| 1179 | | 5138 | 5506 | 5875 | 6243 | 6611 | 6979 | 7348 | 7716 | 8084 | 8452 | 368 |
| 1180 | | 8820 | 9188 | 9556 | 9924 | *0292 | *0660 | *1028 | *1396 | *1763 | *2131 | 368 |
| 1181 | 072 | 2499 | 2867 | 3234 | 3602 | 3970 | 4337 | 4705 | 5072 | 5440 | 5807 | 368 |
| 1182 | | 6175 | 6542 | 6910 | 7277 | 7644 | 8011 | 8379 | 8746 | 9113 | 9480 | 367 |
| 1183 | | 9847 | *0215 | *0582 | *0949 | *1316 | *1683 | *2050 | *2416 | *2783 | *3150 | 367 |
| 1184 | 073 | 3517 | 3884 | 4251 | 4617 | 4984 | 5351 | 5717 | 6084 | 6450 | 6817 | 367 |
| 1185 | | 7184 | 7550 | 7916 | 8283 | 8649 | 9016 | 9382 | 9748 | *0114 | *0481 | 366 |
| 1186 | 074 | 0847 | 1213 | 1579 | 1945 | 2311 | 2677 | 3043 | 3409 | 3775 | 4141 | 366 |
| 1187 | | 4507 | 4873 | 5239 | 5605 | 5970 | 6336 | 6702 | 7068 | 7433 | 7799 | 366 |
| 1188 | | 8164 | 8530 | 8895 | 9261 | 9626 | 9992 | *0357 | *0723 | *1088 | *1453 | 365 |
| 1189 | 075 | 1819 | 2184 | 2549 | 2914 | 3279 | 3644 | 4010 | 4375 | 4740 | 5105 | 365 |
| 1190 | | 5470 | 5835 | 6199 | 6564 | 6929 | 7294 | 7659 | 8024 | 8388 | 8753 | 365 |
| 1191 | | 9118 | 9482 | 9847 | *0211 | *0576 | *0940 | *1305 | *1669 | *2034 | *2398 | 364 |
| 1192 | 076 | 2763 | 3127 | 3491 | 3855 | 4220 | 4584 | 4948 | 5312 | 5676 | 6040 | 364 |
| 1193 | | 6404 | 6768 | 7132 | 7496 | 7860 | 8224 | 8588 | 8952 | 9316 | 9680 | 364 |
| 1194 | 077 | 0043 | 0407 | 0771 | 1134 | 1498 | 1862 | 2225 | 2589 | 2952 | 3316 | 364 |
| 1195 | | 3679 | 4042 | 4406 | 4769 | 5133 | 5496 | 5859 | 6222 | 6585 | 6949 | 363 |
| 1196 | | 7312 | 7675 | 8038 | 8401 | 8764 | 9127 | 9490 | 9853 | *0216 | *0579 | 363 |
| 1197 | 078 | 0942 | 1304 | 1667 | 2030 | 2393 | 2755 | 3118 | 3480 | 3843 | 4206 | 363 |
| 1198 | | 4568 | 4931 | 5293 | 5656 | 6018 | 6380 | 6743 | 7105 | 7467 | 7830 | 362 |
| 1199 | | 8192 | 8554 | 8916 | 9278 | 9640 | *0003 | *0365 | *0727 | *1089 | *1451 | 362 |
| 1200 | 079 | 1812 | 2174 | 2536 | 2898 | 3260 | 3622 | 3983 | 4345 | 4707 | 5068 | 362 |
| N | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | d. | |

LOGARITHMS OF THE TRIGONOMETRIC FUNCTIONS

Logarithms of the functions are given for each minute from 0-360°.

The quantity -10 is to be appended to all logarithms of the sine and cosine, to logarithms of the tangent from 0-45° and of the cotangent from 45-90°.

With degrees indicated at either side of the top of the page use the column headings at the top. With degrees stated at the bottom of the page use the column designations at the bottom.

With degrees at the left (top or bottom) use the minute column at the left, and with degrees on the right side of the page use the minute column at the right.

The method of determining the functions of small angles by the auxiliary quantities S and T is given in the section explaining the use of the mathematical tables at the front of the volume.

LOGARITHMS OF TRIGONOMETRIC FUNCTIONS

| Min . | Values of S, — 10 to be appended | | | | | | Values of T, — 10 to be appended | | | | | | Sec. |
|-------|-------------------------------------|-----|-----|-----|-----|-----|-------------------------------------|-----|-----|-----|-----|-----|------|
| | 0° | 1° | 2° | 3° | 4° | 0° | 1° | 2° | 3° | 4° | | | |
| 0' | 4.68 | 557 | 555 | 549 | 538 | 522 | 4.68 | 557 | 562 | 575 | 597 | 628 | 0' |
| 1 | | 557 | 555 | 549 | 537 | 522 | | 557 | 562 | 575 | 598 | 629 | 60 |
| 2 | | 557 | 555 | 548 | 537 | 522 | | 557 | 562 | 576 | 598 | 629 | 120 |
| 3 | | 557 | 555 | 548 | 537 | 521 | | 557 | 562 | 578 | 599 | 630 | 180 |
| 4 | | 557 | 555 | 548 | 537 | 521 | | 558 | 563 | 576 | 599 | 631 | 240 |
| 5 | | 557 | 555 | 548 | 537 | 521 | | 558 | 563 | 577 | 599 | 631 | 300 |
| 6 | | 557 | 555 | 548 | 536 | 520 | | 558 | 563 | 577 | 600 | 632 | 360 |
| 7 | | 557 | 555 | 548 | 536 | 520 | | 558 | 563 | 577 | 600 | 632 | 420 |
| 8 | | 557 | 555 | 548 | 536 | 520 | | 558 | 563 | 578 | 601 | 633 | 480 |
| 9 | | 557 | 555 | 547 | 536 | 520 | | 558 | 563 | 578 | 601 | 634 | 540 |
| 10 | 4.68 | 557 | 555 | 547 | 535 | 519 | 4.68 | 558 | 564 | 578 | 602 | 634 | 600 |
| 11 | | 557 | 554 | 547 | 535 | 519 | | 558 | 564 | 579 | 602 | 635 | 660 |
| 12 | | 557 | 554 | 547 | 535 | 519 | | 558 | 564 | 579 | 603 | 635 | 720 |
| 13 | | 557 | 554 | 547 | 535 | 518 | | 558 | 564 | 579 | 603 | 636 | 780 |
| 14 | | 557 | 554 | 547 | 534 | 518 | | 558 | 564 | 580 | 604 | 637 | 840 |
| 15 | | 557 | 554 | 546 | 534 | 518 | | 558 | 564 | 580 | 604 | 637 | 900 |
| 16 | | 557 | 554 | 546 | 534 | 517 | | 558 | 565 | 580 | 605 | 638 | 960 |
| 17 | | 557 | 554 | 546 | 534 | 517 | | 558 | 565 | 581 | 605 | 639 | 1020 |
| 18 | | 557 | 554 | 546 | 534 | 517 | | 558 | 565 | 581 | 606 | 639 | 1080 |
| 19 | | 557 | 554 | 546 | 533 | 516 | | 558 | 565 | 581 | 606 | 640 | 1140 |
| 20 | 4.68 | 557 | 554 | 546 | 533 | 516 | 4.68 | 558 | 565 | 582 | 607 | 640 | 1200 |
| 21 | | 557 | 554 | 545 | 533 | 516 | | 558 | 566 | 582 | 607 | 641 | 1260 |
| 22 | | 557 | 553 | 545 | 533 | 515 | | 558 | 566 | 582 | 608 | 642 | 1320 |
| 23 | | 557 | 553 | 545 | 532 | 515 | | 558 | 566 | 583 | 608 | 642 | 1380 |
| 24 | | 557 | 553 | 545 | 532 | 515 | | 558 | 566 | 583 | 609 | 643 | 1440 |
| 25 | | 557 | 553 | 545 | 532 | 515 | | 558 | 566 | 583 | 609 | 644 | 1500 |
| 26 | | 557 | 553 | 544 | 532 | 514 | | 558 | 567 | 584 | 610 | 644 | 1560 |
| 27 | | 557 | 553 | 544 | 531 | 514 | | 558 | 567 | 584 | 610 | 645 | 1620 |
| 28 | | 557 | 553 | 544 | 531 | 514 | | 558 | 567 | 584 | 611 | 646 | 1680 |
| 29 | | 557 | 553 | 544 | 531 | 513 | | 559 | 567 | 585 | 611 | 646 | 1740 |
| 30 | 4.68 | 557 | 553 | 544 | 531 | 513 | 4.68 | 559 | 567 | 585 | 612 | 647 | 1800 |
| 31 | | 557 | 552 | 544 | 530 | 513 | | 559 | 568 | 585 | 612 | 648 | 1860 |
| 32 | | 557 | 552 | 543 | 530 | 512 | | 559 | 568 | 586 | 613 | 648 | 1920 |
| 33 | | 557 | 552 | 543 | 530 | 512 | | 559 | 568 | 586 | 613 | 649 | 1980 |
| 34 | | 557 | 552 | 543 | 529 | 512 | | 559 | 568 | 587 | 614 | 650 | 2040 |
| 35 | | 557 | 552 | 543 | 529 | 511 | | 559 | 569 | 587 | 614 | 650 | 2100 |
| 36 | | 557 | 552 | 543 | 529 | 511 | | 559 | 569 | 587 | 615 | 651 | 2160 |
| 37 | | 557 | 552 | 542 | 529 | 511 | | 559 | 569 | 588 | 615 | 652 | 2220 |
| 38 | | 557 | 552 | 542 | 528 | 510 | | 559 | 569 | 588 | 616 | 652 | 2280 |
| 39 | | 557 | 552 | 542 | 528 | 510 | | 559 | 570 | 589 | 616 | 653 | 2340 |
| 40 | 4.68 | 557 | 551 | 542 | 528 | 510 | 4.68 | 559 | 570 | 589 | 617 | 654 | 2400 |
| 41 | | 556 | 551 | 542 | 528 | 509 | | 560 | 570 | 589 | 617 | 654 | 2460 |
| 42 | | 556 | 551 | 541 | 527 | 509 | | 560 | 570 | 590 | 618 | 655 | 2520 |
| 43 | | 556 | 551 | 541 | 527 | 508 | | 560 | 571 | 590 | 619 | 656 | 2580 |
| 44 | | 556 | 551 | 541 | 527 | 508 | | 560 | 571 | 591 | 619 | 656 | 2640 |
| 45 | | 556 | 551 | 541 | 527 | 508 | | 560 | 571 | 591 | 620 | 657 | 2700 |
| 46 | | 556 | 551 | 541 | 526 | 507 | | 560 | 571 | 591 | 620 | 658 | 2760 |
| 47 | | 556 | 551 | 540 | 526 | 507 | | 560 | 572 | 592 | 621 | 659 | 2820 |
| 48 | | 556 | 550 | 540 | 526 | 507 | | 560 | 572 | 592 | 621 | 659 | 2880 |
| 49 | | 556 | 550 | 540 | 525 | 506 | | 560 | 572 | 593 | 622 | 660 | 2940 |
| 50 | 4.68 | 556 | 550 | 540 | 525 | 506 | 4.68 | 561 | 572 | 593 | 622 | 661 | 3000 |
| 51 | | 556 | 550 | 540 | 525 | 506 | | 561 | 573 | 593 | 623 | 661 | 3060 |
| 52 | | 556 | 550 | 539 | 525 | 505 | | 561 | 573 | 594 | 624 | 662 | 3120 |
| 53 | | 556 | 550 | 539 | 524 | 505 | | 561 | 573 | 594 | 624 | 663 | 3180 |
| 54 | | 556 | 550 | 539 | 524 | 505 | | 561 | 573 | 595 | 625 | 664 | 3240 |
| 55 | | 556 | 549 | 539 | 524 | 504 | | 561 | 574 | 595 | 625 | 664 | 3300 |
| 56 | | 556 | 549 | 539 | 523 | 504 | | 561 | 574 | 596 | 626 | 665 | 3360 |
| 57 | | 556 | 549 | 538 | 523 | 503 | | 562 | 574 | 596 | 626 | 666 | 3420 |
| 58 | | 555 | 549 | 538 | 523 | 503 | | 562 | 575 | 596 | 627 | 667 | 3480 |
| 59 | | 555 | 549 | 538 | 523 | 503 | | 562 | 575 | 597 | 628 | 667 | 3540 |
| 60 | 4.68 | 555 | 549 | 538 | 522 | 502 | 4.68 | 562 | 575 | 597 | 628 | 668 | 3600 |

LOGARITHMS OF THE FUNCTIONS (Continued)

0° (180°)

(359°) 179°

| ° | L. Sin. | d. | C. S. | C. T. | L. Tan. | c.d. | L. Cot. | L. Cos. | ° |
|------|-------------|-------|----------|----------|----------|-------|----------|----------|----|
| 0 | 0 | | | | | | | | 60 |
| 60 | 1 6.46 373 | 30103 | 5.31 443 | 5.31 443 | 6.46 373 | 30103 | 3.53 627 | 0.00 000 | 59 |
| 120 | 2 6.76 476 | 17699 | 5.31 443 | 5.31 443 | 6.76 476 | 17699 | 3.23 524 | 0.00 000 | 58 |
| 180 | 3 6.94 085 | 12494 | 5.31 443 | 5.31 443 | 6.94 085 | 12494 | 3.05 915 | 0.00 000 | 57 |
| 240 | 4 7.06 579 | 9691 | 5.31 443 | 5.31 442 | 7.06 579 | 9691 | 2.93 421 | 0.00 000 | 56 |
| 300 | 5 7.16 270 | 7918 | 5.31 443 | 5.31 442 | 7.16 270 | 7918 | 2.83 730 | 0.00 000 | 55 |
| 360 | 6 7.24 188 | 6694 | 5.31 443 | 5.31 442 | 7.24 188 | 6694 | 2.75 812 | 0.00 000 | 54 |
| 420 | 7 7.30 882 | 5800 | 5.31 443 | 5.31 442 | 7.30 882 | 5800 | 2.69 118 | 0.00 000 | 53 |
| 480 | 8 7.36 682 | 5115 | 5.31 443 | 5.31 442 | 7.36 682 | 5115 | 2.63 318 | 0.00 000 | 52 |
| 540 | 9 7.41 797 | 4576 | 5.31 443 | 5.31 442 | 7.41 797 | 4576 | 2.58 203 | 0.00 000 | 51 |
| 600 | 10 7.46 373 | 4139 | 5.31 443 | 5.31 442 | 7.46 373 | 4139 | 2.53 627 | 0.00 000 | 50 |
| 660 | 11 7.50 512 | 3779 | 5.31 443 | 5.31 442 | 7.50 512 | 3779 | 2.49 488 | 0.00 000 | 49 |
| 720 | 12 7.54 291 | 3476 | 5.31 443 | 5.31 442 | 7.54 291 | 3476 | 2.45 709 | 0.00 000 | 48 |
| 780 | 13 7.57 767 | 3218 | 5.31 443 | 5.31 442 | 7.57 767 | 3219 | 2.42 233 | 0.00 000 | 47 |
| 840 | 14 7.60 985 | 2997 | 5.31 443 | 5.31 442 | 7.60 986 | 2996 | 2.39 014 | 0.00 000 | 46 |
| 900 | 15 7.63 982 | 2802 | 5.31 443 | 5.31 442 | 7.63 982 | 2803 | 2.36 018 | 0.00 000 | 45 |
| 960 | 16 7.66 784 | 2633 | 5.31 443 | 5.31 442 | 7.66 785 | 2633 | 2.33 215 | 0.00 000 | 44 |
| 1020 | 17 7.69 417 | 2483 | 5.31 443 | 5.31 442 | 7.69 418 | 2482 | 2.30 582 | 9.99 999 | 43 |
| 1080 | 18 7.71 900 | 2348 | 5.31 443 | 5.31 442 | 7.71 900 | 2348 | 2.28 100 | 9.99 999 | 42 |
| 1140 | 19 7.74 248 | 2227 | 5.31 443 | 5.31 442 | 7.74 248 | 2228 | 2.25 752 | 9.99 999 | 41 |
| 1200 | 20 7.76 475 | 2119 | 5.31 443 | 5.31 442 | 7.76 476 | 2119 | 2.23 524 | 9.99 999 | 40 |
| 1260 | 21 7.78 594 | 2021 | 5.31 443 | 5.31 442 | 7.78 595 | 2020 | 2.21 405 | 9.99 999 | 39 |
| 1320 | 22 7.80 615 | 1930 | 5.31 443 | 5.31 442 | 7.80 615 | 1931 | 2.19 385 | 9.99 999 | 38 |
| 1380 | 23 7.82 545 | 1848 | 5.31 443 | 5.31 442 | 7.82 546 | 1848 | 2.17 454 | 9.99 999 | 37 |
| 1440 | 24 7.84 393 | 1773 | 5.31 443 | 5.31 442 | 7.84 394 | 1773 | 2.15 606 | 9.99 999 | 36 |
| 1500 | 25 7.86 166 | 1704 | 5.31 443 | 5.31 442 | 7.86 167 | 1704 | 2.13 833 | 9.99 999 | 35 |
| 1560 | 26 7.87 870 | 1639 | 5.31 443 | 5.31 442 | 7.87 871 | 1639 | 2.12 129 | 9.99 999 | 34 |
| 1620 | 27 7.89 509 | 1579 | 5.31 443 | 5.31 442 | 7.89 510 | 1579 | 2.10 490 | 9.99 999 | 33 |
| 1680 | 28 7.91 088 | 1524 | 5.31 443 | 5.31 442 | 7.91 089 | 1524 | 2.08 911 | 9.99 999 | 32 |
| 1740 | 29 7.92 612 | 1472 | 5.31 443 | 5.31 441 | 7.92 613 | 1473 | 2.07 387 | 9.99 998 | 31 |
| 1800 | 30 7.94 084 | 1424 | 5.31 443 | 5.31 441 | 7.94 086 | 1424 | 2.05 914 | 9.99 998 | 30 |
| 1860 | 31 7.95 508 | 1379 | 5.31 443 | 5.31 441 | 7.95 510 | 1379 | 2.04 490 | 9.99 998 | 29 |
| 1920 | 32 7.96 887 | 1336 | 5.31 443 | 5.31 441 | 7.96 889 | 1336 | 2.03 111 | 9.99 998 | 28 |
| 1980 | 33 7.98 223 | 1297 | 5.31 443 | 5.31 441 | 7.98 225 | 1297 | 2.01 775 | 9.99 998 | 27 |
| 2040 | 34 7.99 520 | 1259 | 5.31 443 | 5.31 441 | 7.99 522 | 1259 | 2.00 478 | 9.99 998 | 26 |
| 2100 | 35 8.00 779 | 1223 | 5.31 443 | 5.31 441 | 8.00 781 | 1223 | 1.99 219 | 9.99 998 | 25 |
| 2160 | 36 8.02 002 | 1190 | 5.31 443 | 5.31 441 | 8.02 004 | 1190 | 1.97 996 | 9.99 998 | 24 |
| 2220 | 37 8.03 192 | 1158 | 5.31 443 | 5.31 441 | 8.03 194 | 1159 | 1.96 806 | 9.99 997 | 23 |
| 2280 | 38 8.04 350 | 1128 | 5.31 443 | 5.31 441 | 8.04 353 | 1128 | 1.95 647 | 9.99 997 | 22 |
| 2340 | 39 8.05 478 | 1100 | 5.31 443 | 5.31 441 | 8.05 481 | 1100 | 1.94 519 | 9.99 997 | 21 |
| 2400 | 40 8.06 578 | 1072 | 5.31 443 | 5.31 441 | 8.06 581 | 1072 | 1.93 419 | 9.99 997 | 20 |
| 2460 | 41 8.07 650 | 1046 | 5.31 444 | 5.31 440 | 8.07 653 | 1047 | 1.92 347 | 9.99 997 | 19 |
| 2520 | 42 8.08 696 | 1022 | 5.31 444 | 5.31 440 | 8.08 700 | 1022 | 1.91 300 | 9.99 997 | 18 |
| 2580 | 43 8.09 718 | 999 | 5.31 444 | 5.31 440 | 8.09 722 | 998 | 1.90 278 | 9.99 997 | 17 |
| 2640 | 44 8.10 717 | 976 | 5.31 444 | 5.31 440 | 8.10 720 | 976 | 1.89 280 | 9.99 996 | 16 |
| 2700 | 45 8.11 693 | 954 | 5.31 444 | 5.31 440 | 8.11 696 | 955 | 1.88 304 | 9.99 996 | 15 |
| 2760 | 46 8.12 647 | 934 | 5.31 444 | 5.31 440 | 8.12 651 | 934 | 1.87 349 | 9.99 996 | 14 |
| 2820 | 47 8.13 581 | 914 | 5.31 444 | 5.31 440 | 8.13 585 | 915 | 1.86 415 | 9.99 996 | 13 |
| 2880 | 48 8.14 495 | 896 | 5.31 444 | 5.31 440 | 8.14 500 | 895 | 1.85 500 | 9.99 996 | 12 |
| 2940 | 49 8.15 391 | 877 | 5.31 444 | 5.31 440 | 8.15 395 | 878 | 1.84 605 | 9.99 996 | 11 |
| 3000 | 50 8.16 268 | 860 | 5.31 444 | 5.31 439 | 8.16 273 | 860 | 1.83 727 | 9.99 995 | 10 |
| 3060 | 51 8.17 128 | 843 | 5.31 444 | 5.31 439 | 8.17 133 | 843 | 1.82 867 | 9.99 995 | 9 |
| 3120 | 52 8.17 971 | 827 | 5.31 444 | 5.31 439 | 8.17 976 | 828 | 1.82 024 | 9.99 995 | 8 |
| 3180 | 53 8.18 798 | 812 | 5.31 444 | 5.31 439 | 8.18 804 | 812 | 1.81 196 | 9.99 995 | 7 |
| 3240 | 54 8.19 610 | 797 | 5.31 444 | 5.31 439 | 8.19 616 | 797 | 1.80 384 | 9.99 995 | 6 |
| 3300 | 55 8.20 407 | 782 | 5.31 444 | 5.31 439 | 8.20 413 | 782 | 1.79 587 | 9.99 994 | 5 |
| 3360 | 56 8.21 189 | 769 | 5.31 444 | 5.31 439 | 8.21 195 | 769 | 1.78 805 | 9.99 994 | 4 |
| 3420 | 57 8.21 958 | 755 | 5.31 445 | 5.31 438 | 8.21 964 | 756 | 1.78 036 | 9.99 994 | 3 |
| 3480 | 58 8.22 713 | 743 | 5.31 445 | 5.31 438 | 8.22 720 | 742 | 1.77 280 | 9.99 994 | 2 |
| 3540 | 59 8.23 456 | 730 | 5.31 445 | 5.31 438 | 8.23 462 | 730 | 1.76 538 | 9.99 994 | 1 |
| 3600 | 60 8.24 186 | | 5.31 445 | 5.31 438 | 8.24 192 | | 1.75 808 | 9.99 993 | 0 |
| | L. Cos. | d. | | | L. Cot. | c.d. | L. Tan. | L. Sin. | |

90° (270°)

(269°) 89°

LOGARITHMS OF THE FUNCTIONS (Continued)

1° (181°)

(358°) 178°

| | L. Sin. | d. | C. S. | C. T. | L. Tan. | c.d. | L. Cot. | L. Cos. | |
|------|-------------|-----|----------|----------|----------|------|----------|----------|----|
| 3600 | 0 8.24 186 | 717 | 5.31 445 | 5.31 438 | 8.24 192 | | 1.75 808 | 9.99 993 | 60 |
| 3660 | 1 8.24 903 | 706 | 5.31 445 | 5.31 438 | 8.24 910 | 718 | 1.75 090 | 9.99 993 | 59 |
| 3720 | 2 8.25 609 | 695 | 5.31 445 | 5.31 438 | 8.25 616 | 706 | 1.74 384 | 9.99 993 | 58 |
| 3780 | 3 8.26 304 | 684 | 5.31 445 | 5.31 438 | 8.26 312 | 696 | 1.73 688 | 9.99 993 | 57 |
| 3840 | 4 8.26 988 | 673 | 5.31 445 | 5.31 437 | 8.26 996 | 684 | 1.73 004 | 9.99 992 | 56 |
| 3900 | 5 8.27 661 | 663 | 5.31 445 | 5.31 437 | 8.27 669 | 673 | 1.72 331 | 9.99 992 | 55 |
| 3960 | 6 8.28 324 | 653 | 5.31 445 | 5.31 437 | 8.28 332 | 663 | 1.71 668 | 9.99 992 | 54 |
| 4020 | 7 8.28 977 | 644 | 5.31 445 | 5.31 437 | 8.28 986 | 654 | 1.71 014 | 9.99 992 | 53 |
| 4080 | 8 8.29 621 | 634 | 5.31 445 | 5.31 437 | 8.29 629 | 643 | 1.70 371 | 9.99 992 | 52 |
| 4140 | 9 8.30 255 | 624 | 5.31 445 | 5.31 437 | 8.30 263 | 634 | 1.69 737 | 9.99 991 | 51 |
| 4200 | 10 8.30 879 | 616 | 5.31 446 | 5.31 437 | 8.30 888 | 625 | 1.69 112 | 9.99 991 | 50 |
| 4260 | 11 8.31 495 | 608 | 5.31 446 | 5.31 436 | 8.31 505 | 617 | 1.68 495 | 9.99 991 | 49 |
| 4320 | 12 8.32 103 | 599 | 5.31 446 | 5.31 436 | 8.32 112 | 607 | 1.67 888 | 9.99 990 | 48 |
| 4380 | 13 8.32 702 | 590 | 5.31 446 | 5.31 436 | 8.32 711 | 599 | 1.67 289 | 9.99 990 | 47 |
| 4440 | 14 8.33 292 | 583 | 5.31 446 | 5.31 436 | 8.33 302 | 591 | 1.66 698 | 9.99 990 | 46 |
| 4500 | 15 8.33 875 | 575 | 5.31 446 | 5.31 436 | 8.33 886 | 584 | 1.66 114 | 9.99 990 | 45 |
| 4560 | 16 8.34 450 | 568 | 5.31 446 | 5.31 435 | 8.34 461 | 575 | 1.65 539 | 9.99 989 | 44 |
| 4620 | 17 8.35 018 | 560 | 5.31 446 | 5.31 435 | 8.35 029 | 568 | 1.64 971 | 9.99 989 | 43 |
| 4680 | 18 8.35 578 | 553 | 5.31 446 | 5.31 435 | 8.35 590 | 561 | 1.64 410 | 9.99 989 | 42 |
| 4740 | 19 8.36 131 | 547 | 5.31 446 | 5.31 435 | 8.36 143 | 553 | 1.63 857 | 9.99 989 | 41 |
| 4800 | 20 8.36 678 | 539 | 5.31 446 | 5.31 435 | 8.36 689 | 546 | 1.63 311 | 9.99 988 | 40 |
| 4860 | 21 8.37 217 | 533 | 5.31 447 | 5.31 434 | 8.37 229 | 540 | 1.62 771 | 9.99 988 | 39 |
| 4920 | 22 8.37 750 | 526 | 5.31 447 | 5.31 434 | 8.37 762 | 533 | 1.62 238 | 9.99 988 | 38 |
| 4980 | 23 8.38 276 | 520 | 5.31 447 | 5.31 434 | 8.38 289 | 527 | 1.61 711 | 9.99 987 | 37 |
| 5040 | 24 8.38 796 | 514 | 5.31 447 | 5.31 434 | 8.38 809 | 520 | 1.61 191 | 9.99 987 | 36 |
| 5100 | 25 8.39 310 | 508 | 5.31 447 | 5.31 434 | 8.39 323 | 514 | 1.60 677 | 9.99 987 | 35 |
| 5160 | 26 8.39 818 | 502 | 5.31 447 | 5.31 433 | 8.39 832 | 509 | 1.60 168 | 9.99 986 | 34 |
| 5220 | 27 8.40 320 | 496 | 5.31 447 | 5.31 433 | 8.40 334 | 502 | 1.59 666 | 9.99 986 | 33 |
| 5280 | 28 8.40 816 | 491 | 5.31 447 | 5.31 433 | 8.40 830 | 496 | 1.59 170 | 9.99 986 | 32 |
| 5340 | 29 8.41 307 | 485 | 5.31 447 | 5.31 433 | 8.41 321 | 491 | 1.58 679 | 9.99 985 | 31 |
| 5400 | 30 8.41 792 | 480 | 5.31 447 | 5.31 433 | 8.41 807 | 486 | 1.58 193 | 9.99 985 | 30 |
| 5460 | 31 8.42 272 | 474 | 5.31 448 | 5.31 432 | 8.42 287 | 480 | 1.57 713 | 9.99 985 | 29 |
| 5520 | 32 8.42 746 | 470 | 5.31 448 | 5.31 432 | 8.42 762 | 475 | 1.57 238 | 9.99 984 | 28 |
| 5580 | 33 8.43 216 | 464 | 5.31 448 | 5.31 432 | 8.43 232 | 470 | 1.56 768 | 9.99 984 | 27 |
| 5640 | 34 8.43 680 | 459 | 5.31 448 | 5.31 432 | 8.43 696 | 464 | 1.56 304 | 9.99 984 | 26 |
| 5700 | 35 8.44 139 | 455 | 5.31 448 | 5.31 431 | 8.44 156 | 460 | 1.55 844 | 9.99 983 | 25 |
| 5760 | 36 8.44 594 | 450 | 5.31 448 | 5.31 431 | 8.44 611 | 455 | 1.55 389 | 9.99 983 | 24 |
| 5820 | 37 8.45 044 | 445 | 5.31 448 | 5.31 431 | 8.45 061 | 450 | 1.54 939 | 9.99 983 | 23 |
| 5880 | 38 8.45 489 | 441 | 5.31 448 | 5.31 431 | 8.45 507 | 446 | 1.54 493 | 9.99 982 | 22 |
| 5940 | 39 8.45 930 | 436 | 5.31 449 | 5.31 431 | 8.45 948 | 441 | 1.54 052 | 9.99 982 | 21 |
| 6000 | 40 8.46 366 | 433 | 5.31 449 | 5.31 430 | 8.46 385 | 437 | 1.53 615 | 9.99 982 | 20 |
| 6060 | 41 8.46 799 | 427 | 5.31 449 | 5.31 430 | 8.46 817 | 432 | 1.53 183 | 9.99 981 | 19 |
| 6120 | 42 8.47 226 | 424 | 5.31 449 | 5.31 430 | 8.47 245 | 428 | 1.52 755 | 9.99 981 | 18 |
| 6180 | 43 8.47 650 | 419 | 5.31 449 | 5.31 430 | 8.47 669 | 424 | 1.52 331 | 9.99 981 | 17 |
| 6240 | 44 8.48 069 | 416 | 5.31 449 | 5.31 429 | 8.48 089 | 420 | 1.51 911 | 9.99 980 | 16 |
| 6300 | 45 8.48 485 | 411 | 5.31 449 | 5.31 429 | 8.48 505 | 416 | 1.51 495 | 9.99 980 | 15 |
| 6360 | 46 8.48 896 | 408 | 5.31 449 | 5.31 429 | 8.48 917 | 412 | 1.51 083 | 9.99 979 | 14 |
| 6420 | 47 8.49 304 | 404 | 5.31 450 | 5.31 428 | 8.49 325 | 408 | 1.50 675 | 9.99 979 | 13 |
| 6480 | 48 8.49 708 | 400 | 5.31 450 | 5.31 428 | 8.49 729 | 404 | 1.50 271 | 9.99 979 | 12 |
| 6540 | 49 8.50 108 | 396 | 5.31 450 | 5.31 428 | 8.50 130 | 401 | 1.49 870 | 9.99 978 | 11 |
| 6600 | 50 8.50 504 | 393 | 5.31 450 | 5.31 427 | 8.50 527 | 397 | 1.49 473 | 9.99 978 | 10 |
| 6660 | 51 8.50 897 | 390 | 5.31 450 | 5.31 427 | 8.50 920 | 393 | 1.49 080 | 9.99 977 | 9 |
| 6720 | 52 8.51 287 | 386 | 5.31 450 | 5.31 427 | 8.51 310 | 390 | 1.48 690 | 9.99 977 | 8 |
| 6780 | 53 8.51 673 | 382 | 5.31 450 | 5.31 427 | 8.51 696 | 386 | 1.48 304 | 9.99 977 | 7 |
| 6840 | 54 8.52 055 | 379 | 5.31 450 | 5.31 427 | 8.52 079 | 383 | 1.47 921 | 9.99 976 | 6 |
| 6900 | 55 8.52 434 | 376 | 5.31 451 | 5.31 426 | 8.52 459 | 380 | 1.47 541 | 9.99 976 | 5 |
| 6960 | 56 8.52 810 | 373 | 5.31 451 | 5.31 426 | 8.52 835 | 376 | 1.47 165 | 9.99 975 | 4 |
| 7020 | 57 8.53 183 | 369 | 5.31 451 | 5.31 426 | 8.53 208 | 373 | 1.46 792 | 9.99 975 | 3 |
| 7080 | 58 8.53 552 | 367 | 5.31 451 | 5.31 425 | 8.53 578 | 370 | 1.46 422 | 9.99 974 | 2 |
| 7140 | 59 8.53 919 | 363 | 5.31 451 | 5.31 425 | 8.53 945 | 367 | 1.46 055 | 9.99 974 | 1 |
| 7200 | 60 8.54 282 | | 5.31 451 | 5.31 425 | 8.54 308 | 363 | 1.45 692 | 9.99 974 | 0 |
| | L. Cos. | d. | | | L. Cot. | c.d. | L. Tan. | L. Sin. | |

91° (271°)

(268°) 88°

LOGARITHMS OF THE FUNCTIONS (Continued)

| 2° (182°) | | | | | (257°) 177° | | | | |
|-----------|-------------|-----|----------|----------|-------------|------|----------|----------|----|
| | L. Sin. | d. | C. S. | C. T. | L. Tan. | c.d. | L. Cot. | L. Cos. | |
| 7200 | 0 8.54 282 | 360 | 5.31 451 | 5.31 425 | 8.54 308 | 361 | 1.45 692 | 9.99 974 | 60 |
| 7260 | 1 8.54 642 | 357 | 5.31 451 | 5.31 425 | 8.54 669 | 358 | 1.45 331 | 9.99 973 | 59 |
| 7320 | 2 8.54 999 | 355 | 5.31 452 | 5.31 424 | 8.55 027 | 355 | 1.44 973 | 9.99 973 | 58 |
| 7380 | 3 8.55 354 | 351 | 5.31 452 | 5.31 424 | 8.55 382 | 352 | 1.44 618 | 9.99 972 | 57 |
| 7440 | 4 8.55 705 | 349 | 5.31 452 | 5.31 424 | 8.55 734 | 349 | 1.44 266 | 9.99 972 | 56 |
| 7500 | 5 8.56 054 | 346 | 5.31 452 | 5.31 423 | 8.56 083 | 346 | 1.43 917 | 9.99 971 | 55 |
| 7560 | 6 8.56 400 | 343 | 5.31 452 | 5.31 423 | 8.56 429 | 344 | 1.43 571 | 9.99 971 | 54 |
| 7620 | 7 8.56 743 | 341 | 5.31 452 | 5.31 423 | 8.56 773 | 341 | 1.43 227 | 9.99 970 | 53 |
| 7680 | 8 8.57 084 | 337 | 5.31 453 | 5.31 422 | 8.57 114 | 338 | 1.42 886 | 9.99 970 | 52 |
| 7740 | 9 8.57 421 | 336 | 5.31 453 | 5.31 422 | 8.57 452 | 336 | 1.42 548 | 9.99 969 | 51 |
| 7800 | 10 8.57 757 | 332 | 5.31 453 | 5.31 422 | 8.57 788 | 333 | 1.42 212 | 9.99 969 | 50 |
| 7860 | 11 8.58 089 | 330 | 5.31 453 | 5.31 421 | 8.58 121 | 330 | 1.41 879 | 9.99 968 | 49 |
| 7920 | 12 8.58 419 | 328 | 5.31 453 | 5.31 421 | 8.58 451 | 328 | 1.41 549 | 9.99 968 | 48 |
| 7980 | 13 8.58 747 | 325 | 5.31 453 | 5.31 421 | 8.58 779 | 326 | 1.41 221 | 9.99 967 | 47 |
| 8040 | 14 8.59 072 | 323 | 5.31 454 | 5.31 421 | 8.59 105 | 323 | 1.40 895 | 9.99 967 | 46 |
| 8100 | 15 8.59 395 | 320 | 5.31 454 | 5.31 420 | 8.59 428 | 321 | 1.40 572 | 9.99 967 | 45 |
| 8160 | 16 8.59 715 | 318 | 5.31 454 | 5.31 420 | 8.59 749 | 319 | 1.40 251 | 9.99 966 | 44 |
| 8220 | 17 8.60 033 | 316 | 5.31 454 | 5.31 420 | 8.60 068 | 316 | 1.39 932 | 9.99 966 | 43 |
| 8280 | 18 8.60 349 | 313 | 5.31 454 | 5.31 419 | 8.60 384 | 314 | 1.39 616 | 9.99 965 | 42 |
| 8340 | 19 8.60 662 | 311 | 5.31 454 | 5.31 419 | 8.60 698 | 311 | 1.39 302 | 9.99 964 | 41 |
| 8400 | 20 8.60 973 | 309 | 5.31 455 | 5.31 418 | 8.61 009 | 310 | 1.38 991 | 9.99 964 | 40 |
| 8460 | 21 8.61 282 | 307 | 5.31 455 | 5.31 418 | 8.61 319 | 307 | 1.38 681 | 9.99 963 | 39 |
| 8520 | 22 8.61 589 | 307 | 5.31 455 | 5.31 418 | 8.61 626 | 305 | 1.38 374 | 9.99 963 | 38 |
| 8580 | 23 8.61 894 | 305 | 5.31 455 | 5.31 417 | 8.61 931 | 303 | 1.38 069 | 9.99 962 | 37 |
| 8640 | 24 8.62 196 | 301 | 5.31 455 | 5.31 417 | 8.62 234 | 301 | 1.37 766 | 9.99 962 | 36 |
| 8700 | 25 8.62 497 | 298 | 5.31 455 | 5.31 417 | 8.62 535 | 299 | 1.37 465 | 9.99 961 | 35 |
| 8760 | 26 8.62 795 | 296 | 5.31 456 | 5.31 416 | 8.62 834 | 297 | 1.37 166 | 9.99 961 | 34 |
| 8820 | 27 8.63 091 | 294 | 5.31 456 | 5.31 416 | 8.63 131 | 295 | 1.36 869 | 9.99 960 | 33 |
| 8880 | 28 8.63 385 | 293 | 5.31 456 | 5.31 416 | 8.63 426 | 292 | 1.36 574 | 9.99 960 | 32 |
| 8940 | 29 8.63 678 | 290 | 5.31 456 | 5.31 415 | 8.63 718 | 291 | 1.36 282 | 9.99 959 | 31 |
| 9000 | 30 8.63 968 | 288 | 5.31 456 | 5.31 415 | 8.64 009 | 289 | 1.35 991 | 9.99 959 | 30 |
| 9060 | 31 8.64 256 | 287 | 5.31 456 | 5.31 415 | 8.64 298 | 287 | 1.35 702 | 9.99 958 | 29 |
| 9120 | 32 8.64 543 | 284 | 5.31 457 | 5.31 414 | 8.64 585 | 285 | 1.35 415 | 9.99 958 | 28 |
| 9180 | 33 8.64 827 | 283 | 5.31 457 | 5.31 414 | 8.64 870 | 284 | 1.35 130 | 9.99 957 | 27 |
| 9240 | 34 8.65 110 | 281 | 5.31 457 | 5.31 413 | 8.65 154 | 281 | 1.34 846 | 9.99 956 | 26 |
| 9300 | 35 8.65 391 | 279 | 5.31 457 | 5.31 413 | 8.65 435 | 280 | 1.34 565 | 9.99 956 | 25 |
| 9360 | 36 8.65 670 | 277 | 5.31 457 | 5.31 413 | 8.65 715 | 278 | 1.34 285 | 9.99 955 | 24 |
| 9420 | 37 8.65 947 | 276 | 5.31 458 | 5.31 412 | 8.65 993 | 276 | 1.34 007 | 9.99 955 | 23 |
| 9480 | 38 8.66 223 | 274 | 5.31 458 | 5.31 412 | 8.66 269 | 274 | 1.33 731 | 9.99 954 | 22 |
| 9540 | 39 8.66 497 | 272 | 5.31 458 | 5.31 412 | 8.66 543 | 273 | 1.33 457 | 9.99 954 | 21 |
| 9600 | 40 8.66 769 | 270 | 5.31 458 | 5.31 411 | 8.66 816 | 271 | 1.33 184 | 9.99 953 | 20 |
| 9660 | 41 8.67 039 | 269 | 5.31 458 | 5.31 411 | 8.67 087 | 269 | 1.32 913 | 9.99 952 | 19 |
| 9720 | 42 8.67 308 | 267 | 5.31 459 | 5.31 410 | 8.67 356 | 268 | 1.32 644 | 9.99 952 | 18 |
| 9780 | 43 8.67 575 | 266 | 5.31 459 | 5.31 410 | 8.67 624 | 266 | 1.32 376 | 9.99 951 | 17 |
| 9840 | 44 8.67 841 | 263 | 5.31 459 | 5.31 410 | 8.67 890 | 264 | 1.32 110 | 9.99 951 | 16 |
| 9900 | 45 8.68 104 | 263 | 5.31 459 | 5.31 409 | 8.68 154 | 263 | 1.31 846 | 9.99 950 | 15 |
| 9960 | 46 8.68 367 | 260 | 5.31 459 | 5.31 409 | 8.68 417 | 261 | 1.31 583 | 9.99 949 | 14 |
| 10020 | 47 8.68 627 | 259 | 5.31 460 | 5.31 408 | 8.68 678 | 260 | 1.31 322 | 9.99 949 | 13 |
| 10080 | 48 8.68 886 | 258 | 5.31 460 | 5.31 408 | 8.68 938 | 258 | 1.31 062 | 9.99 948 | 12 |
| 10140 | 49 8.69 144 | 256 | 5.31 460 | 5.31 408 | 8.69 196 | 257 | 1.30 804 | 9.99 948 | 11 |
| 10200 | 50 8.69 400 | 254 | 5.31 460 | 5.31 407 | 8.69 453 | 255 | 1.30 547 | 9.99 947 | 10 |
| 10260 | 51 8.69 654 | 253 | 5.31 461 | 5.31 407 | 8.69 708 | 254 | 1.30 292 | 9.99 946 | 9 |
| 10320 | 52 8.69 907 | 252 | 5.31 461 | 5.31 406 | 8.69 962 | 252 | 1.30 038 | 9.99 946 | 8 |
| 10380 | 53 8.70 159 | 250 | 5.31 461 | 5.31 406 | 8.70 214 | 251 | 1.29 786 | 9.99 945 | 7 |
| 10440 | 54 8.70 409 | 249 | 5.31 461 | 5.31 405 | 8.70 465 | 249 | 1.29 535 | 9.99 944 | 6 |
| 10500 | 55 8.70 658 | 247 | 5.31 461 | 5.31 405 | 8.70 714 | 248 | 1.29 286 | 9.99 944 | 5 |
| 10560 | 56 8.70 905 | 246 | 5.31 461 | 5.31 405 | 8.70 962 | 246 | 1.29 038 | 9.99 943 | 4 |
| 10620 | 57 8.71 151 | 244 | 5.31 462 | 5.31 404 | 8.71 208 | 245 | 1.28 792 | 9.99 942 | 3 |
| 10680 | 58 8.71 395 | 243 | 5.31 462 | 5.31 404 | 8.71 453 | 244 | 1.28 547 | 9.99 942 | 2 |
| 10740 | 59 8.71 638 | 242 | 5.31 462 | 5.31 403 | 8.71 697 | 243 | 1.28 303 | 9.99 941 | 1 |
| 10800 | 60 8.71 880 | | 5.31 462 | 5.31 403 | 8.71 940 | | 1.28 060 | 9.99 940 | 0 |
| | L. Cos. | d. | | | L. Cot. | c.d. | L. Tan. | L. Sin. | |

92° (272°)

(267°) 87°

LOGARITHMS OF THE FUNCTIONS (Continued)

8° (183°)

(356°) 176°

| | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | | P. P. | | | | | |
|----|----------|-----|----------|------|----------|----------|----|-------|------|------|------|------|------|
| 0 | 8.71 880 | 240 | 8.71 940 | 241 | 1.28 060 | 9.99 940 | 60 | " | 241 | 239 | 237 | 235 | 234 |
| 1 | 8.72 120 | 239 | 8.72 181 | 239 | 1.27 819 | 9.99 940 | 59 | 1 | 4.0 | 4.0 | 4.0 | 3.9 | 3.9 |
| 2 | 8.72 359 | 238 | 8.72 420 | 239 | 1.27 580 | 9.99 939 | 58 | 2 | 8.0 | 8.0 | 7.9 | 7.8 | 7.8 |
| 3 | 8.72 597 | 237 | 8.72 659 | 237 | 1.27 341 | 9.99 938 | 57 | 3 | 12.0 | 12.0 | 11.8 | 11.8 | 11.7 |
| 4 | 8.72 834 | 235 | 8.72 896 | 236 | 1.27 104 | 9.99 938 | 56 | 4 | 16.1 | 15.9 | 15.8 | 15.7 | 15.6 |
| 5 | 8.73 069 | 234 | 8.73 132 | 234 | 1.26 868 | 9.99 937 | 55 | 5 | 20.1 | 19.9 | 19.8 | 19.6 | 19.5 |
| 6 | 8.73 303 | 232 | 8.73 366 | 234 | 1.26 634 | 9.99 936 | 54 | 6 | 24.1 | 23.9 | 23.7 | 23.5 | 23.4 |
| 7 | 8.73 535 | 232 | 8.73 600 | 232 | 1.26 400 | 9.99 936 | 53 | 7 | 28.1 | 27.9 | 27.6 | 27.4 | 27.3 |
| 8 | 8.73 767 | 230 | 8.73 832 | 231 | 1.26 168 | 9.99 935 | 52 | 8 | 32.1 | 31.9 | 31.6 | 31.3 | 31.2 |
| 9 | 8.73 997 | 229 | 8.74 063 | 229 | 1.25 937 | 9.99 934 | 51 | 9 | 36.2 | 35.8 | 35.6 | 35.2 | 35.1 |
| 10 | 8.74 226 | 228 | 8.74 292 | 229 | 1.25 708 | 9.99 934 | 50 | " | 232 | 229 | 227 | 225 | 223 |
| 11 | 8.74 454 | 226 | 8.74 521 | 227 | 1.25 479 | 9.99 933 | 49 | 1 | 3.9 | 3.8 | 3.8 | 3.8 | 3.7 |
| 12 | 8.74 680 | 226 | 8.74 748 | 226 | 1.25 252 | 9.99 932 | 48 | 2 | 7.7 | 7.6 | 7.6 | 7.5 | 7.4 |
| 13 | 8.74 906 | 224 | 8.74 974 | 225 | 1.25 026 | 9.99 932 | 47 | 3 | 11.6 | 11.4 | 11.4 | 11.2 | 11.2 |
| 14 | 8.75 130 | 223 | 8.75 199 | 224 | 1.24 801 | 9.99 931 | 46 | 4 | 15.5 | 15.3 | 15.1 | 15.0 | 14.9 |
| 15 | 8.75 353 | 222 | 8.75 423 | 222 | 1.24 577 | 9.99 930 | 45 | 5 | 19.3 | 19.1 | 18.9 | 18.8 | 18.6 |
| 16 | 8.75 575 | 220 | 8.75 645 | 222 | 1.24 355 | 9.99 929 | 44 | 6 | 23.2 | 22.9 | 22.7 | 22.5 | 22.3 |
| 17 | 8.75 795 | 220 | 8.75 867 | 220 | 1.24 133 | 9.99 929 | 43 | 7 | 27.1 | 26.7 | 26.5 | 26.2 | 26.0 |
| 18 | 8.76 015 | 219 | 8.76 087 | 219 | 1.23 913 | 9.99 928 | 42 | 8 | 30.9 | 30.5 | 30.3 | 30.0 | 29.7 |
| 19 | 8.76 234 | 217 | 8.76 306 | 219 | 1.23 694 | 9.99 927 | 41 | 9 | 34.8 | 34.4 | 34.0 | 33.8 | 33.4 |
| 20 | 8.76 451 | 216 | 8.76 525 | 217 | 1.23 475 | 9.99 926 | 40 | " | 222 | 220 | 217 | 215 | 213 |
| 21 | 8.76 667 | 216 | 8.76 742 | 216 | 1.23 258 | 9.99 926 | 39 | 1 | 3.7 | 3.7 | 3.6 | 3.6 | 3.6 |
| 22 | 8.76 883 | 214 | 8.76 958 | 215 | 1.23 042 | 9.99 925 | 38 | 2 | 7.4 | 7.3 | 7.2 | 7.2 | 7.1 |
| 23 | 8.77 097 | 213 | 8.77 173 | 214 | 1.22 827 | 9.99 924 | 37 | 3 | 11.1 | 11.0 | 10.8 | 10.8 | 10.6 |
| 24 | 8.77 310 | 212 | 8.77 387 | 213 | 1.22 613 | 9.99 923 | 36 | 4 | 14.8 | 14.7 | 14.5 | 14.3 | 14.2 |
| 25 | 8.77 522 | 211 | 8.77 600 | 211 | 1.22 400 | 9.99 923 | 35 | 5 | 18.5 | 18.3 | 18.1 | 17.9 | 17.8 |
| 26 | 8.77 733 | 210 | 8.77 811 | 211 | 1.22 189 | 9.99 922 | 34 | 6 | 22.2 | 22.0 | 21.7 | 21.5 | 21.3 |
| 27 | 8.77 943 | 209 | 8.78 022 | 210 | 1.21 978 | 9.99 921 | 33 | 7 | 25.9 | 25.7 | 25.3 | 25.1 | 24.8 |
| 28 | 8.78 152 | 208 | 8.78 232 | 209 | 1.21 768 | 9.99 920 | 32 | 8 | 29.6 | 29.3 | 28.9 | 28.7 | 28.4 |
| 29 | 8.78 360 | 208 | 8.78 441 | 208 | 1.21 559 | 9.99 920 | 31 | 9 | 33.3 | 33.0 | 32.6 | 32.2 | 32.0 |
| 30 | 8.78 568 | 206 | 8.78 649 | 206 | 1.21 351 | 9.99 919 | 30 | " | 211 | 208 | 206 | 203 | 201 |
| 31 | 8.78 774 | 205 | 8.78 855 | 206 | 1.21 145 | 9.99 918 | 29 | 1 | 3.5 | 3.5 | 3.4 | 3.4 | 3.4 |
| 32 | 8.78 979 | 204 | 8.79 061 | 205 | 1.20 939 | 9.99 917 | 28 | 2 | 7.0 | 6.9 | 6.9 | 6.8 | 6.7 |
| 33 | 8.79 183 | 203 | 8.79 266 | 204 | 1.20 734 | 9.99 917 | 27 | 3 | 10.6 | 10.4 | 10.3 | 10.2 | 10.0 |
| 34 | 8.79 386 | 202 | 8.79 470 | 203 | 1.20 530 | 9.99 916 | 26 | 4 | 14.1 | 13.9 | 13.7 | 13.5 | 13.4 |
| 35 | 8.79 588 | 201 | 8.79 673 | 202 | 1.20 327 | 9.99 915 | 25 | 5 | 17.6 | 17.3 | 17.2 | 16.9 | 16.8 |
| 36 | 8.79 789 | 201 | 8.79 875 | 201 | 1.20 125 | 9.99 914 | 24 | 6 | 21.1 | 20.8 | 20.6 | 20.3 | 20.1 |
| 37 | 8.79 990 | 199 | 8.80 076 | 201 | 1.19 924 | 9.99 913 | 23 | 7 | 24.6 | 24.3 | 24.0 | 23.7 | 23.4 |
| 38 | 8.80 189 | 199 | 8.80 277 | 199 | 1.19 723 | 9.99 913 | 22 | 8 | 28.1 | 27.7 | 27.5 | 27.1 | 26.8 |
| 39 | 8.80 388 | 197 | 8.80 476 | 198 | 1.19 524 | 9.99 912 | 21 | 9 | 31.6 | 31.2 | 30.9 | 30.4 | 30.2 |
| 40 | 8.80 585 | 197 | 8.80 674 | 198 | 1.19 326 | 9.99 911 | 20 | " | 199 | 197 | 195 | 193 | 192 |
| 41 | 8.80 782 | 196 | 8.80 872 | 196 | 1.19 128 | 9.99 910 | 19 | 1 | 3.3 | 3.3 | 3.2 | 3.2 | 3.2 |
| 42 | 8.80 978 | 195 | 8.81 068 | 196 | 1.18 932 | 9.99 909 | 18 | 2 | 6.6 | 6.6 | 6.5 | 6.4 | 6.4 |
| 43 | 8.81 173 | 194 | 8.81 264 | 195 | 1.18 736 | 9.99 909 | 17 | 3 | 10.0 | 9.8 | 9.8 | 9.6 | 9.6 |
| 44 | 8.81 367 | 193 | 8.81 459 | 194 | 1.18 541 | 9.99 908 | 16 | 4 | 13.3 | 13.1 | 13.0 | 12.9 | 12.8 |
| 45 | 8.81 560 | 192 | 8.81 653 | 193 | 1.18 347 | 9.99 907 | 15 | 5 | 16.6 | 16.4 | 16.2 | 16.1 | 16.0 |
| 46 | 8.81 752 | 192 | 8.81 846 | 192 | 1.18 154 | 9.99 906 | 14 | 6 | 19.9 | 19.7 | 19.5 | 19.3 | 19.2 |
| 47 | 8.81 944 | 190 | 8.82 038 | 192 | 1.17 962 | 9.99 905 | 13 | 7 | 23.2 | 23.0 | 22.8 | 22.5 | 22.4 |
| 48 | 8.82 134 | 190 | 8.82 230 | 190 | 1.17 770 | 9.99 904 | 12 | 8 | 26.5 | 26.3 | 26.0 | 25.7 | 25.6 |
| 49 | 8.82 324 | 189 | 8.82 420 | 190 | 1.17 580 | 9.99 904 | 11 | 9 | 29.8 | 29.6 | 29.2 | 29.0 | 28.8 |
| 50 | 8.82 513 | 188 | 8.82 610 | 189 | 1.17 390 | 9.99 903 | 10 | " | 189 | 187 | 185 | 183 | 181 |
| 51 | 8.82 701 | 187 | 8.82 799 | 188 | 1.17 201 | 9.99 902 | 9 | 1 | 3.2 | 3.1 | 3.1 | 3.0 | 3.0 |
| 52 | 8.82 888 | 187 | 8.82 987 | 188 | 1.17 013 | 9.99 901 | 8 | 2 | 6.3 | 6.2 | 6.2 | 6.1 | 6.0 |
| 53 | 8.83 075 | 186 | 8.83 175 | 186 | 1.16 825 | 9.99 900 | 7 | 3 | 9.4 | 9.4 | 9.2 | 9.2 | 9.0 |
| 54 | 8.83 261 | 185 | 8.83 361 | 186 | 1.16 639 | 9.99 899 | 6 | 4 | 12.6 | 12.5 | 12.3 | 12.2 | 12.1 |
| 55 | 8.83 446 | 184 | 8.83 547 | 185 | 1.16 453 | 9.99 898 | 5 | 5 | 15.8 | 15.6 | 15.4 | 15.2 | 15.1 |
| 56 | 8.83 630 | 183 | 8.83 732 | 184 | 1.16 268 | 9.99 898 | 4 | 6 | 18.9 | 18.7 | 18.5 | 18.3 | 18.1 |
| 57 | 8.83 813 | 183 | 8.83 916 | 184 | 1.16 084 | 9.99 897 | 3 | 7 | 22.0 | 21.8 | 21.6 | 21.4 | 21.1 |
| 58 | 8.83 996 | 181 | 8.84 100 | 182 | 1.15 900 | 9.99 896 | 2 | 8 | 25.2 | 24.9 | 24.7 | 24.4 | 24.1 |
| 59 | 8.84 177 | 181 | 8.84 282 | 182 | 1.15 718 | 9.99 895 | 1 | 9 | 28.4 | 28.0 | 27.8 | 27.4 | 27.2 |
| 60 | 8.84 358 | | 8.84 464 | | 1.15 536 | 9.99 894 | 0 | 10 | 31.5 | 31.2 | 30.8 | 30.5 | 30.2 |
| | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | | P. P. | | | | | |

93° (273°)

(266°) 86°

LOGARITHMS OF THE FUNCTIONS (Continued)

4° (184°)

(355°) 175°

| | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | | P. P. |
|----|----------|-----|----------|------|----------|----------|----|------------------------|
| 0 | 8.84 358 | | 8.84 464 | | 1.15 536 | 9.99 894 | 60 | 182 181 179 178 177 |
| 1 | 8.84 539 | 181 | 8.84 646 | 182 | 1.15 354 | 9.99 893 | 59 | 1 3.0 3.0 3.0 3.0 |
| 2 | 8.84 718 | 179 | 8.84 826 | 180 | 1.15 174 | 9.99 892 | 58 | 2 6.1 6.0 6.0 5.9 |
| 3 | 8.84 897 | 179 | 8.85 006 | 180 | 1.14 994 | 9.99 891 | 57 | 3 9.1 9.0 9.0 8.9 |
| 4 | 8.85 075 | 177 | 8.85 185 | 178 | 1.14 815 | 9.99 891 | 56 | 4 12.1 12.1 11.9 11.9 |
| 5 | 8.85 252 | 177 | 8.85 363 | 177 | 1.14 637 | 9.99 890 | 55 | 5 15.2 15.1 14.9 14.8 |
| 6 | 8.85 429 | 176 | 8.85 540 | 177 | 1.14 460 | 9.99 889 | 54 | 6 18.2 18.1 17.9 17.8 |
| 7 | 8.85 605 | 175 | 8.85 717 | 176 | 1.14 283 | 9.99 888 | 53 | 7 21.2 21.1 20.9 20.8 |
| 8 | 8.85 780 | 175 | 8.85 893 | 176 | 1.14 107 | 9.99 887 | 52 | 8 24.3 24.1 23.9 23.7 |
| 9 | 8.85 955 | 173 | 8.86 069 | 174 | 1.13 931 | 9.99 886 | 51 | 9 27.3 27.2 26.8 26.6 |
| 10 | 8.86 128 | 173 | 8.86 243 | 174 | 1.13 757 | 9.99 885 | 50 | " 176 175 174 173 172 |
| 11 | 8.86 301 | 173 | 8.86 417 | 174 | 1.13 583 | 9.99 884 | 49 | 1 2.9 2.9 2.9 2.9 |
| 12 | 8.86 474 | 171 | 8.86 591 | 172 | 1.13 409 | 9.99 883 | 48 | 2 5.9 5.8 5.8 5.7 |
| 13 | 8.86 645 | 171 | 8.86 763 | 172 | 1.13 237 | 9.99 882 | 47 | 3 8.8 8.8 8.7 8.6 |
| 14 | 8.86 816 | 171 | 8.86 935 | 171 | 1.13 065 | 9.99 881 | 46 | 4 11.7 11.7 11.6 11.5 |
| 15 | 8.86 987 | 169 | 8.87 106 | 171 | 1.12 894 | 9.99 880 | 45 | 5 14.7 14.6 14.5 14.4 |
| 16 | 8.87 156 | 169 | 8.87 277 | 170 | 1.12 723 | 9.99 879 | 44 | 6 17.6 17.5 17.4 17.3 |
| 17 | 8.87 325 | 169 | 8.87 447 | 169 | 1.12 553 | 9.99 879 | 43 | 7 20.5 20.4 20.3 20.2 |
| 18 | 8.87 494 | 167 | 8.87 616 | 169 | 1.12 384 | 9.99 878 | 42 | 8 23.5 23.3 23.2 23.1 |
| 19 | 8.87 661 | 168 | 8.87 785 | 168 | 1.12 215 | 9.99 877 | 41 | 9 26.4 26.2 26.1 26.0 |
| 20 | 8.87 829 | 166 | 8.87 953 | 167 | 1.12 047 | 9.99 876 | 40 | " 171 170 169 168 167 |
| 21 | 8.87 995 | 166 | 8.88 120 | 167 | 1.11 880 | 9.99 875 | 39 | 1 2.8 2.8 2.8 2.8 |
| 22 | 8.88 161 | 165 | 8.88 287 | 166 | 1.11 713 | 9.99 874 | 38 | 2 5.7 5.7 5.6 5.6 |
| 23 | 8.88 326 | 164 | 8.88 453 | 165 | 1.11 547 | 9.99 873 | 37 | 3 8.6 8.5 8.4 8.4 |
| 24 | 8.88 490 | 164 | 8.88 618 | 165 | 1.11 382 | 9.99 872 | 36 | 4 11.4 11.3 11.3 11.2 |
| 25 | 8.88 654 | 163 | 8.88 783 | 165 | 1.11 217 | 9.99 871 | 35 | 5 14.2 14.2 14.1 14.0 |
| 26 | 8.88 817 | 163 | 8.88 948 | 163 | 1.11 052 | 9.99 870 | 34 | 6 17.1 17.0 16.9 16.8 |
| 27 | 8.88 980 | 162 | 8.89 111 | 163 | 1.10 889 | 9.99 869 | 33 | 7 20.0 19.8 19.7 19.6 |
| 28 | 8.89 142 | 162 | 8.89 274 | 163 | 1.10 726 | 9.99 868 | 32 | 8 22.8 22.7 22.5 22.4 |
| 29 | 8.89 304 | 160 | 8.89 437 | 161 | 1.10 563 | 9.99 867 | 31 | 9 25.6 25.5 25.4 25.2 |
| 30 | 8.89 464 | 161 | 8.89 598 | 162 | 1.10 402 | 9.99 866 | 30 | " 166 165 164 163 162 |
| 31 | 8.89 625 | 159 | 8.89 760 | 160 | 1.10 240 | 9.99 865 | 29 | 1 2.8 2.8 2.7 2.7 |
| 32 | 8.89 784 | 159 | 8.89 920 | 160 | 1.10 080 | 9.99 864 | 28 | 2 5.5 5.5 5.5 5.4 |
| 33 | 8.89 943 | 159 | 8.90 080 | 160 | 1.09 920 | 9.99 863 | 27 | 3 8.3 8.2 8.2 8.1 |
| 34 | 8.90 102 | 158 | 8.90 240 | 159 | 1.09 760 | 9.99 862 | 26 | 4 11.1 11.0 10.9 10.9 |
| 35 | 8.90 260 | 157 | 8.90 399 | 158 | 1.09 601 | 9.99 861 | 25 | 5 13.8 13.8 13.7 13.6 |
| 36 | 8.90 417 | 157 | 8.90 557 | 158 | 1.09 443 | 9.99 860 | 24 | 6 16.6 16.5 16.4 16.3 |
| 37 | 8.90 574 | 156 | 8.90 715 | 157 | 1.09 285 | 9.99 859 | 23 | 7 19.4 19.2 19.1 19.0 |
| 38 | 8.90 730 | 155 | 8.90 872 | 157 | 1.09 128 | 9.99 858 | 22 | 8 22.1 22.0 21.9 21.7 |
| 39 | 8.90 885 | 155 | 8.91 029 | 156 | 1.08 971 | 9.99 857 | 21 | 9 24.9 24.8 24.6 24.4 |
| 40 | 8.91 040 | 155 | 8.91 185 | 155 | 1.08 815 | 9.99 856 | 20 | " 161 160 159 158 157 |
| 41 | 8.91 195 | 154 | 8.91 340 | 155 | 1.08 660 | 9.99 855 | 19 | 1 2.7 2.7 2.6 2.6 |
| 42 | 8.91 349 | 153 | 8.91 495 | 155 | 1.08 505 | 9.99 854 | 18 | 2 5.4 5.3 5.3 5.2 |
| 43 | 8.91 502 | 153 | 8.91 650 | 153 | 1.08 350 | 9.99 853 | 17 | 3 8.0 8.0 8.0 7.9 |
| 44 | 8.91 655 | 152 | 8.91 803 | 154 | 1.08 197 | 9.99 852 | 16 | 4 10.7 10.7 10.6 10.5 |
| 45 | 8.91 807 | 152 | 8.91 957 | 153 | 1.08 043 | 9.99 851 | 15 | 5 13.4 13.3 13.2 13.2 |
| 46 | 8.91 959 | 151 | 8.92 110 | 152 | 1.07 890 | 9.99 850 | 14 | 6 16.1 16.0 15.9 15.8 |
| 47 | 8.92 110 | 151 | 8.92 262 | 152 | 1.07 738 | 9.99 848 | 13 | 7 18.8 18.7 18.6 18.4 |
| 48 | 8.92 261 | 150 | 8.92 414 | 151 | 1.07 586 | 9.99 847 | 12 | 8 21.5 21.3 21.2 21.1 |
| 49 | 8.92 411 | 150 | 8.92 565 | 151 | 1.07 435 | 9.99 846 | 11 | 9 24.2 24.0 23.8 23.7 |
| 50 | 8.92 561 | 149 | 8.92 716 | 150 | 1.07 284 | 9.99 845 | 10 | " 156 155 154 153 152 |
| 51 | 8.92 710 | 149 | 8.92 866 | 150 | 1.07 134 | 9.99 844 | 9 | 1 2.6 2.6 2.6 2.6 |
| 52 | 8.92 859 | 148 | 8.93 016 | 149 | 1.06 984 | 9.99 843 | 8 | 2 5.2 5.2 5.1 5.1 |
| 53 | 8.93 007 | 147 | 8.93 165 | 148 | 1.06 835 | 9.99 842 | 7 | 3 7.8 7.8 7.7 7.6 |
| 54 | 8.93 154 | 147 | 8.93 313 | 149 | 1.06 687 | 9.99 841 | 6 | 4 10.4 10.3 10.3 10.2 |
| 55 | 8.93 301 | 147 | 8.93 462 | 147 | 1.06 538 | 9.99 840 | 5 | 5 13.0 12.9 12.8 12.8 |
| 56 | 8.93 448 | 146 | 8.93 609 | 147 | 1.06 391 | 9.99 839 | 4 | 6 15.6 15.5 15.4 15.3 |
| 57 | 8.93 594 | 146 | 8.93 756 | 147 | 1.06 244 | 9.99 838 | 3 | 7 18.2 18.1 18.0 17.8 |
| 58 | 8.93 740 | 145 | 8.93 903 | 146 | 1.06 097 | 9.99 837 | 2 | 8 20.8 20.7 20.5 20.4 |
| 59 | 8.93 885 | 145 | 8.94 049 | 146 | 1.05 951 | 9.99 836 | 1 | 9 23.4 23.2 23.1 23.0 |
| 60 | 8.94 030 | | 8.94 195 | | 1.05 805 | 9.99 834 | 0 | 10 26.0 25.8 25.7 25.5 |
| | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | | P. P. |

94° (274°)

(265°) 85°

LOGARITHMS OF THE FUNCTIONS (Continued)

5° (185°)

(354°) 174°

| | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | ' | P.P. | | | | | |
|----|----------|-----|----------|------|----------|----------|----|------|------|------|------|------|------|
| 0 | 8.94 030 | | 8.94 195 | | 1.05 805 | 9.99 834 | 60 | " | 151 | 149 | 148 | 147 | 146 |
| 1 | 8.94 174 | 144 | 8.94 340 | 145 | 1.05 660 | 9.99 833 | 59 | 1 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 |
| 2 | 8.94 317 | 143 | 8.94 485 | 145 | 1.05 515 | 9.99 832 | 58 | 2 | 5.0 | 5.0 | 4.9 | 4.9 | 4.9 |
| 3 | 8.94 461 | 144 | 8.94 630 | 145 | 1.05 370 | 9.99 831 | 57 | 3 | 7.6 | 7.4 | 7.4 | 7.4 | 7.3 |
| 4 | 8.94 603 | 142 | 8.94 773 | 143 | 1.05 227 | 9.99 830 | 56 | 4 | 10.1 | 9.9 | 9.9 | 9.8 | 9.7 |
| 5 | 8.94 746 | 143 | 8.94 917 | 144 | 1.05 083 | 9.99 829 | 55 | 5 | 12.6 | 12.4 | 12.3 | 12.2 | 12.2 |
| 6 | 8.94 887 | 141 | 8.95 060 | 143 | 1.04 940 | 9.99 828 | 54 | 6 | 15.1 | 14.9 | 14.8 | 14.7 | 14.6 |
| 7 | 8.95 029 | 142 | 8.95 202 | 142 | 1.04 798 | 9.99 827 | 53 | 7 | 17.6 | 17.4 | 17.3 | 17.2 | 17.0 |
| 8 | 8.95 170 | 141 | 8.95 344 | 142 | 1.04 656 | 9.99 826 | 52 | 8 | 20.1 | 19.9 | 19.7 | 19.6 | 19.5 |
| 9 | 8.95 310 | 140 | 8.95 486 | 142 | 1.04 514 | 9.99 824 | 51 | 9 | 22.6 | 22.4 | 22.2 | 22.0 | 21.9 |
| 10 | 8.95 450 | 140 | 8.95 627 | 141 | 1.04 373 | 9.99 823 | 50 | " | 145 | 144 | 143 | 142 | 141 |
| 11 | 8.95 589 | 139 | 8.95 767 | 140 | 1.04 233 | 9.99 822 | 49 | 1 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 |
| 12 | 8.95 728 | 139 | 8.95 908 | 141 | 1.04 092 | 9.99 821 | 48 | 2 | 4.8 | 4.8 | 4.8 | 4.7 | 4.7 |
| 13 | 8.95 867 | 139 | 8.96 047 | 139 | 1.03 953 | 9.99 820 | 47 | 3 | 7.2 | 7.2 | 7.2 | 7.1 | 7.0 |
| 14 | 8.96 005 | 138 | 8.96 187 | 140 | 1.03 813 | 9.99 819 | 46 | 4 | 9.7 | 9.6 | 9.5 | 9.5 | 9.4 |
| 15 | 8.96 143 | 138 | 8.96 325 | 138 | 1.03 675 | 9.99 817 | 45 | 5 | 12.1 | 12.0 | 11.9 | 11.8 | 11.8 |
| 16 | 8.96 280 | 137 | 8.96 464 | 139 | 1.03 536 | 9.99 816 | 44 | 6 | 14.5 | 14.4 | 14.3 | 14.2 | 14.1 |
| 17 | 8.96 417 | 137 | 8.96 602 | 138 | 1.03 398 | 9.99 815 | 43 | 7 | 16.9 | 16.8 | 16.7 | 16.6 | 16.4 |
| 18 | 8.96 553 | 136 | 8.96 739 | 137 | 1.03 261 | 9.99 814 | 42 | 8 | 19.3 | 19.2 | 19.1 | 18.9 | 18.8 |
| 19 | 8.96 689 | 136 | 8.96 877 | 138 | 1.03 123 | 9.99 813 | 41 | 9 | 21.8 | 21.6 | 21.4 | 21.3 | 21.2 |
| 20 | 8.96 825 | 136 | 8.97 013 | 136 | 1.02 987 | 9.99 812 | 40 | " | 140 | 139 | 138 | 137 | 136 |
| 21 | 8.96 960 | 135 | 8.97 150 | 137 | 1.02 850 | 9.99 810 | 39 | 1 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 |
| 22 | 8.97 095 | 135 | 8.97 285 | 135 | 1.02 715 | 9.99 809 | 38 | 2 | 4.7 | 4.6 | 4.6 | 4.6 | 4.5 |
| 23 | 8.97 229 | 134 | 8.97 421 | 136 | 1.02 579 | 9.99 808 | 37 | 3 | 7.0 | 7.0 | 6.9 | 6.8 | 6.8 |
| 24 | 8.97 363 | 134 | 8.97 556 | 135 | 1.02 444 | 9.99 807 | 36 | 4 | 9.3 | 9.3 | 9.2 | 9.1 | 9.1 |
| 25 | 8.97 496 | 133 | 8.97 691 | 135 | 1.02 309 | 9.99 806 | 35 | 5 | 11.7 | 11.6 | 11.5 | 11.4 | 11.3 |
| 26 | 8.97 629 | 133 | 8.97 825 | 134 | 1.02 175 | 9.99 804 | 34 | 6 | 14.0 | 13.9 | 13.8 | 13.7 | 13.6 |
| 27 | 8.97 762 | 133 | 8.97 959 | 134 | 1.02 041 | 9.99 803 | 33 | 7 | 16.3 | 16.2 | 16.1 | 16.0 | 15.9 |
| 28 | 8.97 894 | 132 | 8.98 092 | 133 | 1.01 908 | 9.99 802 | 32 | 8 | 18.7 | 18.5 | 18.4 | 18.3 | 18.1 |
| 29 | 8.98 026 | 132 | 8.98 225 | 133 | 1.01 775 | 9.99 801 | 31 | 9 | 21.0 | 20.8 | 20.7 | 20.6 | 20.4 |
| 30 | 8.98 157 | 131 | 8.98 358 | 133 | 1.01 642 | 9.99 800 | 30 | " | 135 | 134 | 133 | 132 | 131 |
| 31 | 8.98 288 | 131 | 8.98 490 | 132 | 1.01 510 | 9.99 798 | 29 | 1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 |
| 32 | 8.98 419 | 131 | 8.98 622 | 132 | 1.01 378 | 9.99 797 | 28 | 2 | 4.5 | 4.5 | 4.4 | 4.4 | 4.4 |
| 33 | 8.98 549 | 130 | 8.98 753 | 131 | 1.01 247 | 9.99 796 | 27 | 3 | 6.8 | 6.7 | 6.6 | 6.6 | 6.6 |
| 34 | 8.98 679 | 130 | 8.98 884 | 131 | 1.01 116 | 9.99 795 | 26 | 4 | 9.0 | 8.9 | 8.9 | 8.8 | 8.7 |
| 35 | 8.98 808 | 129 | 8.99 015 | 131 | 1.00 985 | 9.99 793 | 25 | 5 | 11.2 | 11.2 | 11.1 | 11.0 | 10.9 |
| 36 | 8.98 937 | 129 | 8.99 145 | 130 | 1.00 855 | 9.99 792 | 24 | 6 | 13.5 | 13.4 | 13.3 | 13.2 | 13.1 |
| 37 | 8.99 066 | 129 | 8.99 275 | 130 | 1.00 725 | 9.99 791 | 23 | 7 | 15.8 | 15.6 | 15.5 | 15.4 | 15.3 |
| 38 | 8.99 194 | 128 | 8.99 405 | 130 | 1.00 595 | 9.99 790 | 22 | 8 | 18.0 | 17.9 | 17.7 | 17.6 | 17.5 |
| 39 | 8.99 322 | 128 | 8.99 534 | 129 | 1.00 466 | 9.99 788 | 21 | 9 | 20.2 | 20.1 | 20.0 | 19.8 | 19.6 |
| 40 | 8.99 450 | 128 | 8.99 662 | 128 | 1.00 338 | 9.99 787 | 20 | " | 130 | 129 | 128 | 127 | 126 |
| 41 | 8.99 577 | 127 | 8.99 791 | 129 | 1.00 209 | 9.99 786 | 19 | 1 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 |
| 42 | 8.99 704 | 127 | 8.99 919 | 128 | 1.00 081 | 9.99 785 | 18 | 2 | 4.3 | 4.3 | 4.3 | 4.2 | 4.2 |
| 43 | 8.99 830 | 126 | 9.00 046 | 127 | 0.99 954 | 9.99 783 | 17 | 3 | 6.5 | 6.4 | 6.4 | 6.4 | 6.3 |
| 44 | 8.99 956 | 126 | 9.00 174 | 128 | 0.99 826 | 9.99 782 | 16 | 4 | 8.7 | 8.6 | 8.5 | 8.5 | 8.4 |
| 45 | 9.00 082 | 126 | 9.00 301 | 127 | 0.99 699 | 9.99 781 | 15 | 5 | 10.8 | 10.8 | 10.7 | 10.6 | 10.5 |
| 46 | 9.00 207 | 125 | 9.00 427 | 126 | 0.99 573 | 9.99 780 | 14 | 6 | 13.0 | 12.9 | 12.8 | 12.7 | 12.6 |
| 47 | 9.00 332 | 125 | 9.00 553 | 126 | 0.99 447 | 9.99 778 | 13 | 7 | 15.2 | 15.0 | 14.9 | 14.8 | 14.7 |
| 48 | 9.00 456 | 124 | 9.00 679 | 126 | 0.99 321 | 9.99 777 | 12 | 8 | 17.3 | 17.2 | 17.1 | 16.9 | 16.8 |
| 49 | 9.00 581 | 123 | 9.00 805 | 125 | 0.99 195 | 9.99 776 | 11 | 9 | 19.5 | 19.4 | 19.2 | 19.0 | 18.9 |
| 50 | 9.00 704 | 123 | 9.00 930 | 125 | 0.99 070 | 9.99 775 | 10 | " | 125 | 124 | 123 | 122 | 121 |
| 51 | 9.00 828 | 124 | 9.01 055 | 125 | 0.98 945 | 9.99 773 | 9 | 1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 |
| 52 | 9.00 951 | 123 | 9.01 179 | 124 | 0.98 821 | 9.99 772 | 8 | 2 | 4.2 | 4.1 | 4.1 | 4.1 | 4.0 |
| 53 | 9.01 074 | 123 | 9.01 303 | 124 | 0.98 697 | 9.99 771 | 7 | 3 | 6.2 | 6.2 | 6.2 | 6.1 | 6.0 |
| 54 | 9.01 196 | 122 | 9.01 427 | 124 | 0.98 573 | 9.99 769 | 6 | 4 | 8.3 | 8.3 | 8.2 | 8.1 | 8.1 |
| 55 | 9.01 318 | 122 | 9.01 550 | 123 | 0.98 450 | 9.99 768 | 5 | 5 | 10.4 | 10.3 | 10.2 | 10.2 | 10.1 |
| 56 | 9.01 440 | 121 | 9.01 673 | 123 | 0.98 327 | 9.99 767 | 4 | 6 | 12.5 | 12.4 | 12.3 | 12.2 | 12.1 |
| 57 | 9.01 561 | 121 | 9.01 796 | 122 | 0.98 204 | 9.99 765 | 3 | 7 | 14.6 | 14.5 | 14.4 | 14.2 | 14.1 |
| 58 | 9.01 682 | 121 | 9.01 918 | 122 | 0.98 082 | 9.99 764 | 2 | 8 | 16.7 | 16.5 | 16.4 | 16.3 | 16.1 |
| 59 | 9.01 803 | 121 | 9.02 040 | 122 | 0.97 960 | 9.99 763 | 1 | 9 | 18.8 | 18.6 | 18.4 | 18.3 | 18.2 |
| 60 | 9.01 923 | 120 | 9.02 162 | 122 | 0.97 838 | 9.99 761 | 0 | 10 | 20.8 | 20.7 | 20.5 | 20.3 | 20.2 |
| | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | | | P.P. | | | | |

95° (275°)

(264°) 84°

LOGARITHMS OF THE FUNCTIONS (Continued)

6° (186°)

(353°) 173°

| | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | | P. P. | | | | |
|----|----------|-----|----------|------|----------|----------|----|-------|-------|-------|------|------|
| 0 | 9.01 923 | | 9.02 162 | | 0.97 838 | 9.99 761 | 60 | " | 121 | 120 | 119 | 118 |
| 1 | 9.02 043 | 120 | 9.02 283 | 121 | 0.97 717 | 9.99 760 | 59 | 1 | 2.0 | 2.0 | 2.0 | 2.0 |
| 2 | 9.02 163 | 120 | 9.02 404 | 121 | 0.97 596 | 9.99 759 | 58 | 2 | 4.0 | 4.0 | 4.0 | 3.9 |
| 3 | 9.02 283 | 120 | 9.02 525 | 121 | 0.97 475 | 9.99 757 | 57 | 3 | 6.0 | 6.0 | 6.0 | 5.9 |
| 4 | 9.02 402 | 119 | 9.02 645 | 120 | 0.97 355 | 9.99 756 | 56 | 4 | 8.1 | 8.0 | 7.9 | 7.9 |
| | | 118 | | 121 | | | | | | | | |
| 5 | 9.02 520 | 119 | 9.02 766 | 119 | 0.97 234 | 9.99 755 | 55 | 5 | 10.1 | 10.0 | 9.9 | 9.8 |
| 6 | 9.02 639 | 119 | 9.02 885 | 119 | 0.97 115 | 9.99 753 | 54 | 6 | 12.1 | 12.0 | 11.9 | 11.8 |
| 7 | 9.02 757 | 118 | 9.03 005 | 120 | 0.96 995 | 9.99 752 | 53 | 7 | 14.1 | 14.0 | 13.9 | 13.8 |
| 8 | 9.02 874 | 117 | 9.03 124 | 119 | 0.96 876 | 9.99 751 | 52 | 8 | 16.1 | 16.0 | 15.9 | 15.7 |
| 9 | 9.02 992 | 118 | 9.03 242 | 118 | 0.96 758 | 9.99 749 | 51 | 9 | 18.2 | 18.0 | 17.8 | 17.7 |
| | | 117 | | 119 | | | | | | | | |
| 10 | 9.03 109 | 117 | 9.03 361 | 119 | 0.96 639 | 9.99 748 | 50 | 10 | 20.2 | 20.0 | 19.8 | 19.7 |
| 11 | 9.03 226 | 116 | 9.03 479 | 118 | 0.96 521 | 9.99 747 | 49 | 20 | 40.3 | 40.0 | 39.7 | 39.3 |
| 12 | 9.03 342 | 116 | 9.03 597 | 118 | 0.96 403 | 9.99 745 | 48 | 30 | 60.5 | 60.0 | 59.5 | 59.0 |
| 13 | 9.03 458 | 116 | 9.03 714 | 117 | 0.96 286 | 9.99 744 | 47 | 40 | 80.7 | 80.0 | 79.3 | 78.7 |
| 14 | 9.03 574 | 116 | 9.03 832 | 118 | 0.96 168 | 9.99 742 | 46 | 50 | 100.8 | 100.0 | 99.2 | 98.3 |
| | | 116 | | 116 | | | | | | | | |
| 15 | 9.03 690 | 115 | 9.03 948 | 117 | 0.96 052 | 9.99 741 | 45 | " | 117 | 116 | 115 | 114 |
| 16 | 9.03 805 | 115 | 9.04 065 | 117 | 0.95 935 | 9.99 740 | 44 | 1 | 2.0 | 1.9 | 1.9 | 1.9 |
| 17 | 9.03 920 | 115 | 9.04 181 | 116 | 0.95 819 | 9.99 738 | 43 | 2 | 3.9 | 3.9 | 3.8 | 3.8 |
| 18 | 9.04 034 | 114 | 9.04 297 | 116 | 0.95 703 | 9.99 737 | 42 | 3 | 5.8 | 5.8 | 5.8 | 5.7 |
| 19 | 9.04 149 | 115 | 9.04 413 | 116 | 0.95 587 | 9.99 736 | 41 | 4 | 7.8 | 7.7 | 7.7 | 7.6 |
| | | 113 | | 115 | | | | | | | | |
| 20 | 9.04 262 | 114 | 9.04 528 | 115 | 0.95 472 | 9.99 734 | 40 | 5 | 9.8 | 9.7 | 9.6 | 9.5 |
| 21 | 9.04 376 | 114 | 9.04 643 | 115 | 0.95 357 | 9.99 733 | 39 | 6 | 11.7 | 11.6 | 11.5 | 11.4 |
| 22 | 9.04 490 | 114 | 9.04 758 | 115 | 0.95 242 | 9.99 731 | 38 | 7 | 13.6 | 13.5 | 13.4 | 13.3 |
| 23 | 9.04 603 | 113 | 9.04 873 | 115 | 0.95 127 | 9.99 730 | 37 | 8 | 15.6 | 15.5 | 15.3 | 15.2 |
| 24 | 9.04 715 | 112 | 9.04 987 | 114 | 0.95 013 | 9.99 728 | 36 | 9 | 17.6 | 17.4 | 17.2 | 17.1 |
| | | 113 | | 114 | | | | | | | | |
| 25 | 9.04 828 | 112 | 9.05 101 | 113 | 0.94 899 | 9.99 727 | 35 | 10 | 19.5 | 19.3 | 19.2 | 19.0 |
| 26 | 9.04 940 | 112 | 9.05 214 | 113 | 0.94 786 | 9.99 726 | 34 | 20 | 39.0 | 38.7 | 38.3 | 38.0 |
| 27 | 9.05 052 | 112 | 9.05 328 | 114 | 0.94 672 | 9.99 724 | 33 | 30 | 58.5 | 58.0 | 57.5 | 57.0 |
| 28 | 9.05 164 | 112 | 9.05 441 | 113 | 0.94 559 | 9.99 723 | 32 | 40 | 78.0 | 77.3 | 76.7 | 76.0 |
| 29 | 9.05 275 | 111 | 9.05 553 | 112 | 0.94 447 | 9.99 721 | 31 | 50 | 97.5 | 96.7 | 95.8 | 95.0 |
| | | 111 | | 113 | | | | | | | | |
| 30 | 9.05 386 | 111 | 9.05 666 | 112 | 0.94 334 | 9.99 720 | 30 | " | 113 | 112 | 111 | 110 |
| 31 | 9.05 497 | 110 | 9.05 778 | 112 | 0.94 222 | 9.99 718 | 29 | 1 | 1.9 | 1.9 | 1.8 | 1.8 |
| 32 | 9.05 607 | 110 | 9.05 890 | 112 | 0.94 110 | 9.99 717 | 28 | 2 | 3.8 | 3.7 | 3.7 | 3.7 |
| 33 | 9.05 717 | 110 | 9.06 002 | 112 | 0.93 998 | 9.99 716 | 27 | 3 | 5.6 | 5.6 | 5.6 | 5.5 |
| 34 | 9.05 827 | 110 | 9.06 113 | 111 | 0.93 887 | 9.99 714 | 26 | 4 | 7.5 | 7.5 | 7.4 | 7.3 |
| | | 110 | | 111 | | | | | | | | |
| 35 | 9.05 937 | 109 | 9.06 224 | 111 | 0.93 776 | 9.99 713 | 25 | 5 | 9.4 | 9.3 | 9.2 | 9.2 |
| 36 | 9.06 046 | 109 | 9.06 335 | 111 | 0.93 665 | 9.99 711 | 24 | 6 | 11.3 | 11.2 | 11.1 | 11.0 |
| 37 | 9.06 155 | 109 | 9.06 445 | 110 | 0.93 553 | 9.99 710 | 23 | 7 | 13.2 | 13.1 | 13.0 | 12.8 |
| 38 | 9.06 264 | 109 | 9.06 556 | 111 | 0.93 444 | 9.99 708 | 22 | 8 | 15.1 | 14.9 | 14.8 | 14.7 |
| 39 | 9.06 372 | 108 | 9.06 666 | 110 | 0.93 334 | 9.99 707 | 21 | 9 | 17.0 | 16.8 | 16.6 | 16.5 |
| | | 109 | | 109 | | | | | | | | |
| 40 | 9.06 481 | 108 | 9.06 775 | 110 | 0.93 225 | 9.99 705 | 20 | 10 | 18.8 | 18.7 | 18.5 | 18.3 |
| 41 | 9.06 589 | 107 | 9.06 885 | 109 | 0.93 115 | 9.99 704 | 19 | 20 | 37.7 | 37.3 | 37.0 | 36.7 |
| 42 | 9.06 696 | 108 | 9.06 994 | 109 | 0.93 006 | 9.99 702 | 18 | 30 | 56.5 | 56.0 | 55.5 | 55.0 |
| 43 | 9.06 804 | 107 | 9.07 103 | 109 | 0.92 897 | 9.99 701 | 17 | 40 | 75.3 | 74.7 | 74.0 | 73.3 |
| 44 | 9.06 911 | 107 | 9.07 211 | 108 | 0.92 789 | 9.99 699 | 16 | 50 | 94.2 | 93.3 | 92.5 | 91.7 |
| | | 107 | | 109 | | | | | | | | |
| 45 | 9.07 018 | 106 | 9.07 320 | 108 | 0.92 680 | 9.99 698 | 15 | " | 109 | 108 | 107 | 106 |
| 46 | 9.07 124 | 107 | 9.07 428 | 108 | 0.92 572 | 9.99 696 | 14 | 1 | 1.8 | 1.8 | 1.8 | 1.8 |
| 47 | 9.07 231 | 107 | 9.07 536 | 108 | 0.92 464 | 9.99 695 | 13 | 2 | 3.6 | 3.6 | 3.6 | 3.5 |
| 48 | 9.07 337 | 106 | 9.07 643 | 107 | 0.92 357 | 9.99 693 | 12 | 3 | 5.4 | 5.4 | 5.4 | 5.3 |
| 49 | 9.07 442 | 105 | 9.07 751 | 108 | 0.92 249 | 9.99 692 | 11 | 4 | 7.3 | 7.2 | 7.1 | 7.1 |
| | | 106 | | 107 | | | | | | | | |
| 50 | 9.07 548 | 105 | 9.07 858 | 106 | 0.92 142 | 9.99 690 | 10 | 5 | 9.1 | 9.0 | 8.9 | 8.8 |
| 51 | 9.07 653 | 105 | 9.07 964 | 107 | 0.92 036 | 9.99 689 | 9 | 6 | 10.9 | 10.8 | 10.7 | 10.6 |
| 52 | 9.07 758 | 105 | 9.08 071 | 106 | 0.91 929 | 9.99 687 | 8 | 7 | 12.7 | 12.6 | 12.5 | 12.4 |
| 53 | 9.07 863 | 105 | 9.08 177 | 106 | 0.91 823 | 9.99 686 | 7 | 8 | 14.5 | 14.4 | 14.3 | 14.1 |
| 54 | 9.07 968 | 105 | 9.08 283 | 106 | 0.91 717 | 9.99 684 | 6 | 9 | 16.4 | 16.2 | 16.0 | 15.9 |
| | | 104 | | 106 | | | | | | | | |
| 55 | 9.08 072 | 104 | 9.08 389 | 106 | 0.91 611 | 9.99 683 | 5 | 10 | 18.2 | 18.0 | 17.8 | 17.7 |
| 56 | 9.08 176 | 104 | 9.08 495 | 106 | 0.91 505 | 9.99 681 | 4 | 20 | 36.3 | 36.0 | 35.7 | 35.3 |
| 57 | 9.08 280 | 104 | 9.08 600 | 105 | 0.91 400 | 9.99 680 | 3 | 30 | 54.5 | 54.0 | 53.5 | 53.0 |
| 58 | 9.08 383 | 103 | 9.08 705 | 105 | 0.91 295 | 9.99 678 | 2 | 40 | 72.7 | 72.0 | 71.3 | 70.7 |
| 59 | 9.08 486 | 103 | 9.08 810 | 105 | 0.91 190 | 9.99 677 | 1 | 50 | 90.8 | 90.0 | 89.2 | 88.3 |
| | | 103 | | 104 | | | | | | | | |
| 60 | 9.08 589 | | 9.08 914 | | 0.91 086 | 9.99 675 | 0 | | | | | |
| | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | | P. P. | | | | |

96° (276°)

(263°) 83°

LOGARITHMS OF THE FUNCTIONS (Continued)

7° (187°)

(352°) 172°

| | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | | P. P. | | | | |
|----|----------|-----|----------|------|----------|----------|----|-------|-------|------|------|------|
| 0 | 9.08 589 | | 9.08 914 | | 0.91 086 | 9.99 675 | 60 | " | 105 | 104 | 103 | 102 |
| 1 | 9.08 692 | 103 | 9.09 019 | 105 | 0.90 981 | 9.99 674 | 59 | 1 | 1.8 | 1.7 | 1.7 | 1.7 |
| 2 | 9.08 795 | 103 | 9.09 123 | 104 | 0.90 877 | 9.99 672 | 58 | 2 | 3.5 | 3.5 | 3.4 | 3.4 |
| 3 | 9.08 897 | 102 | 9.09 227 | 104 | 0.90 773 | 9.99 670 | 57 | 3 | 5.2 | 5.2 | 5.2 | 5.1 |
| 4 | 9.08 999 | 102 | 9.09 330 | 103 | 0.90 670 | 9.99 669 | 56 | 4 | 7.0 | 6.9 | 6.9 | 6.8 |
| | | 102 | | 104 | | | | | | | | |
| 5 | 9.09 101 | | 9.09 434 | | 0.90 566 | 9.99 667 | 55 | 5 | 8.8 | 8.7 | 8.6 | 8.5 |
| 6 | 9.09 202 | 101 | 9.09 537 | 103 | 0.90 463 | 9.99 666 | 54 | 6 | 10.5 | 10.4 | 10.3 | 10.2 |
| 7 | 9.09 304 | 102 | 9.09 640 | 103 | 0.90 360 | 9.99 664 | 53 | 7 | 12.2 | 12.1 | 12.0 | 11.9 |
| 8 | 9.09 405 | 101 | 9.09 742 | 102 | 0.90 258 | 9.99 663 | 52 | 8 | 14.0 | 13.9 | 13.7 | 13.6 |
| 9 | 9.09 506 | 101 | 9.09 845 | 103 | 0.90 155 | 9.99 661 | 51 | 9 | 15.8 | 15.6 | 15.4 | 15.3 |
| | | 100 | | 102 | | | | | | | | |
| 10 | 9.09 606 | | 9.09 947 | | 0.90 053 | 9.99 659 | 50 | 10 | 17.5 | 17.3 | 17.2 | 17.0 |
| 11 | 9.09 707 | 101 | 9.10 049 | 102 | 0.89 951 | 9.99 658 | 49 | 20 | 35.0 | 34.7 | 34.3 | 34.0 |
| 12 | 9.09 807 | 100 | 9.10 150 | 101 | 0.89 850 | 9.99 656 | 48 | 30 | 52.5 | 52.0 | 51.5 | 51.0 |
| 13 | 9.09 907 | 99 | 9.10 252 | 102 | 0.89 748 | 9.99 655 | 47 | 40 | 70.0 | 69.3 | 68.7 | 68.0 |
| 14 | 9.10 006 | 99 | 9.10 353 | 101 | 0.89 647 | 9.99 653 | 46 | 50 | 87.5 | 86.7 | 85.8 | 85.0 |
| | | 100 | | 101 | | | | | | | | |
| 15 | 9.10 106 | | 9.10 454 | | 0.89 546 | 9.99 651 | 45 | " | 101 | 100 | 99 | 98 |
| 16 | 9.10 205 | 99 | 9.10 555 | 101 | 0.89 445 | 9.99 650 | 44 | 1 | 1.7 | 1.7 | 1.6 | 1.6 |
| 17 | 9.10 304 | 99 | 9.10 656 | 101 | 0.89 344 | 9.99 648 | 43 | 2 | 3.4 | 3.3 | 3.3 | 3.3 |
| 18 | 9.10 402 | 98 | 9.10 756 | 100 | 0.89 244 | 9.99 647 | 42 | 3 | 5.0 | 5.0 | 5.0 | 4.9 |
| 19 | 9.10 501 | 99 | 9.10 856 | 100 | 0.89 144 | 9.99 645 | 41 | 4 | 6.7 | 6.7 | 6.6 | 6.5 |
| | | 98 | | 100 | | | | | | | | |
| 20 | 9.10 599 | | 9.10 956 | | 0.89 044 | 9.99 643 | 40 | 5 | 8.4 | 8.3 | 8.2 | 8.2 |
| 21 | 9.10 697 | 98 | 9.11 056 | 100 | 0.88 944 | 9.99 642 | 39 | 6 | 10.1 | 10.0 | 9.9 | 9.8 |
| 22 | 9.10 795 | 98 | 9.11 155 | 99 | 0.88 845 | 9.99 640 | 38 | 7 | 11.8 | 11.7 | 11.6 | 11.4 |
| 23 | 9.10 893 | 98 | 9.11 254 | 99 | 0.88 746 | 9.99 638 | 37 | 8 | 13.5 | 13.3 | 13.2 | 13.1 |
| 24 | 9.10 990 | 97 | 9.11 353 | 99 | 0.88 647 | 9.99 637 | 36 | 9 | 15.2 | 15.0 | 14.8 | 14.7 |
| | | 97 | | 99 | | | | | | | | |
| 25 | 9.11 087 | | 9.11 452 | | 0.88 548 | 9.99 635 | 35 | 10 | 16.8 | 16.7 | 16.5 | 16.3 |
| 26 | 9.11 184 | 97 | 9.11 551 | 99 | 0.88 449 | 9.99 633 | 34 | 20 | 33.7 | 33.3 | 33.0 | 32.7 |
| 27 | 9.11 281 | 97 | 9.11 649 | 98 | 0.88 351 | 9.99 632 | 33 | 30 | 50.5 | 50.0 | 49.5 | 49.0 |
| 28 | 9.11 377 | 96 | 9.11 747 | 98 | 0.88 253 | 9.99 630 | 32 | 40 | 67.3 | 66.7 | 66.0 | 65.3 |
| 29 | 9.11 474 | 97 | 9.11 845 | 98 | 0.88 155 | 9.99 629 | 31 | 50 | 84.2 | 83.3 | 82.5 | 81.7 |
| | | 96 | | 98 | | | | | | | | |
| 30 | 9.11 570 | | 9.11 943 | | 0.88 057 | 9.99 627 | 30 | " | 97 | 96 | 95 | 94 |
| 31 | 9.11 666 | 96 | 9.12 040 | 97 | 0.87 960 | 9.99 625 | 29 | 1 | 1.6 | 1.6 | 1.6 | 1.6 |
| 32 | 9.11 761 | 95 | 9.12 138 | 98 | 0.87 862 | 9.99 624 | 28 | 2 | 3.2 | 3.2 | 3.2 | 3.1 |
| 33 | 9.11 857 | 96 | 9.12 235 | 97 | 0.87 765 | 9.99 622 | 27 | 3 | 4.8 | 4.8 | 4.8 | 4.7 |
| 34 | 9.11 952 | 95 | 9.12 332 | 97 | 0.87 668 | 9.99 620 | 26 | 4 | 6.5 | 6.4 | 6.3 | 6.3 |
| | | 95 | | 96 | | | | | | | | |
| 35 | 9.12 047 | | 9.12 428 | | 0.87 572 | 9.99 618 | 25 | 5 | 8.1 | 8.0 | 7.9 | 7.8 |
| 36 | 9.12 142 | 95 | 9.12 525 | 97 | 0.87 475 | 9.99 617 | 24 | 6 | 9.7 | 9.6 | 9.5 | 9.4 |
| 37 | 9.12 236 | 94 | 9.12 621 | 96 | 0.87 379 | 9.99 615 | 23 | 7 | 11.3 | 11.2 | 11.1 | 11.0 |
| 38 | 9.12 331 | 95 | 9.12 717 | 96 | 0.87 283 | 9.99 613 | 22 | 8 | 12.9 | 12.8 | 12.7 | 12.6 |
| 39 | 9.12 425 | 94 | 9.12 813 | 96 | 0.87 187 | 9.99 612 | 21 | 9 | 14.6 | 14.4 | 14.2 | 14.1 |
| | | 94 | | 96 | | | | | | | | |
| 40 | 9.12 519 | | 9.12 909 | | 0.87 091 | 9.99 610 | 20 | 10 | 16.2 | 16.0 | 15.8 | 15.7 |
| 41 | 9.12 612 | 93 | 9.13 004 | 95 | 0.86 996 | 9.99 608 | 19 | 20 | 32.3 | 32.0 | 31.7 | 31.3 |
| 42 | 9.12 706 | 94 | 9.13 099 | 95 | 0.86 901 | 9.99 607 | 18 | 30 | 48.5 | 48.0 | 47.5 | 47.0 |
| 43 | 9.12 799 | 93 | 9.13 194 | 95 | 0.86 806 | 9.99 605 | 17 | 40 | 64.7 | 64.0 | 63.3 | 62.7 |
| 44 | 9.12 892 | 93 | 9.13 289 | 95 | 0.86 711 | 9.99 603 | 16 | 50 | 80.8 | 80.0 | 79.2 | 78.3 |
| | | 93 | | 95 | | | | | | | | |
| 45 | 9.12 985 | | 9.13 384 | | 0.86 616 | 9.99 601 | 15 | " | 93 | 92 | 91 | 90 |
| 46 | 9.13 078 | 93 | 9.13 478 | 94 | 0.86 522 | 9.99 600 | 14 | 1 | 1.6 | 1.5 | 1.5 | 1.5 |
| 47 | 9.13 171 | 92 | 9.13 573 | 95 | 0.86 427 | 9.99 598 | 13 | 2 | 3.1 | 3.1 | 3.0 | 3.0 |
| 48 | 9.13 263 | 92 | 9.13 667 | 94 | 0.86 333 | 9.99 596 | 12 | 3 | 4.6 | 4.6 | 4.6 | 4.5 |
| 49 | 9.13 355 | 92 | 9.13 761 | 94 | 0.86 239 | 9.99 595 | 11 | 4 | 6.2 | 6.1 | 6.1 | 6.0 |
| | | 92 | | 93 | | | | | | | | |
| 50 | 9.13 447 | | 9.13 854 | | 0.86 146 | 9.99 593 | 10 | 5 | 7.8 | 7.7 | 7.6 | 7.5 |
| 51 | 9.13 539 | 92 | 9.13 948 | 94 | 0.86 052 | 9.99 591 | 9 | 6 | 9.3 | 9.2 | 9.1 | 9.0 |
| 52 | 9.13 630 | 91 | 9.14 041 | 93 | 0.85 959 | 9.99 589 | 8 | 7 | 10.8 | 10.7 | 10.6 | 10.5 |
| 53 | 9.13 722 | 92 | 9.14 134 | 93 | 0.85 866 | 9.99 588 | 7 | 8 | 12.4 | 12.3 | 12.1 | 12.0 |
| 54 | 9.13 813 | 91 | 9.14 227 | 93 | 0.85 773 | 9.99 586 | 6 | 9 | 14.0 | 13.8 | 13.6 | 13.5 |
| | | 91 | | 93 | | | | | | | | |
| 55 | 9.13 904 | | 9.14 320 | | 0.85 680 | 9.99 584 | 5 | 10 | 15.5 | 15.3 | 15.2 | 15.0 |
| 56 | 9.13 994 | 90 | 9.14 412 | 92 | 0.85 588 | 9.99 582 | 4 | 20 | 31.0 | 30.7 | 30.3 | 30.0 |
| 57 | 9.14 085 | 90 | 9.14 504 | 92 | 0.85 496 | 9.99 581 | 3 | 30 | 46.5 | 46.0 | 45.5 | 45.0 |
| 58 | 9.14 175 | 91 | 9.14 597 | 93 | 0.85 403 | 9.99 579 | 2 | 40 | 62.0 | 61.3 | 60.7 | 60.0 |
| 59 | 9.14 266 | 90 | 9.14 688 | 91 | 0.85 312 | 9.99 577 | 1 | 50 | 77.5 | 76.7 | 75.8 | 75.0 |
| | | 90 | | 92 | | | | | | | | |
| 60 | 9.14 356 | | 9.14 780 | | 0.85 220 | 9.99 575 | 0 | | | | | |
| | | | | | | | | | | | | |
| | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | | | P. P. | | | |

97° (277°)

(262°) 82°

LOGARITHMS OF THE FUNCTIONS (Continued)

8° (188°)

(351°) 171°

| | L. Sin. | d. | L. Tan. | c. d. | L. Cot. | L. Cos. | | P. P. | | | |
|----|----------|----|----------|-------|----------|----------|----|-------|-------|------|------|
| 0 | 9.14 356 | | 9.14 780 | | 0.85 220 | 9.99 575 | 60 | " | 92 | 91 | 90 |
| 1 | 9.14 445 | 89 | 9.14 872 | 92 | 0.85 128 | 9.99 574 | 59 | 1 | 1.5 | 1.5 | 1.5 |
| 2 | 9.14 535 | 90 | 9.14 963 | 91 | 0.85 037 | 9.99 572 | 58 | 2 | 3.1 | 3.0 | 3.0 |
| 3 | 9.14 624 | 89 | 9.15 054 | 91 | 0.84 946 | 9.99 570 | 57 | 3 | 4.6 | 4.6 | 4.5 |
| 4 | 9.14 714 | 90 | 9.15 145 | 91 | 0.84 855 | 9.99 568 | 56 | 4 | 6.1 | 6.1 | 6.0 |
| 5 | 9.14 803 | 89 | 9.15 236 | 91 | 0.84 764 | 9.99 566 | 55 | 5 | 7.7 | 7.6 | 7.5 |
| 6 | 9.14 891 | 88 | 9.15 327 | 91 | 0.84 673 | 9.99 565 | 54 | 6 | 9.2 | 9.1 | 9.0 |
| 7 | 9.14 980 | 89 | 9.15 417 | 90 | 0.84 583 | 9.99 563 | 53 | 7 | 10.7 | 10.6 | 10.5 |
| 8 | 9.15 069 | 89 | 9.15 508 | 91 | 0.84 492 | 9.99 561 | 52 | 8 | 12.3 | 12.1 | 12.0 |
| 9 | 9.15 157 | 88 | 9.15 598 | 90 | 0.84 402 | 9.99 559 | 51 | 9 | 13.8 | 13.6 | 13.5 |
| 10 | 9.15 245 | 88 | 9.15 688 | 90 | 0.84 312 | 9.99 557 | 50 | 10 | 15.3 | 15.2 | 15.0 |
| 11 | 9.15 333 | 88 | 9.15 777 | 89 | 0.84 223 | 9.99 556 | 49 | 20 | 30.7 | 30.3 | 30.0 |
| 12 | 9.15 421 | 88 | 9.15 867 | 90 | 0.84 133 | 9.99 554 | 48 | 30 | 46.0 | 45.5 | 45.0 |
| 13 | 9.15 508 | 87 | 9.15 956 | 89 | 0.84 044 | 9.99 552 | 47 | 40 | 61.3 | 60.7 | 60.0 |
| 14 | 9.15 596 | 88 | 9.16 046 | 90 | 0.83 954 | 9.99 550 | 46 | 50 | 76.7 | 75.8 | 75.0 |
| 15 | 9.15 683 | 87 | 9.16 135 | 89 | 0.83 865 | 9.99 548 | 45 | " | 89 | 88 | 87 |
| 16 | 9.15 770 | 87 | 9.16 224 | 89 | 0.83 776 | 9.99 546 | 44 | 1 | 1.5 | 1.5 | 1.4 |
| 17 | 9.15 857 | 87 | 9.16 312 | 88 | 0.83 688 | 9.99 545 | 43 | 2 | 3.0 | 2.9 | 2.9 |
| 18 | 9.15 944 | 87 | 9.16 401 | 89 | 0.83 599 | 9.99 543 | 42 | 3 | 4.4 | 4.4 | 4.4 |
| 19 | 9.16 030 | 86 | 9.16 489 | 88 | 0.83 511 | 9.99 541 | 41 | 4 | 5.9 | 5.9 | 5.8 |
| 20 | 9.16 116 | 86 | 9.16 577 | 88 | 0.83 423 | 9.99 539 | 40 | 5 | 7.4 | 7.3 | 7.2 |
| 21 | 9.16 203 | 87 | 9.16 665 | 88 | 0.83 335 | 9.99 537 | 39 | 6 | 8.9 | 8.8 | 8.7 |
| 22 | 9.16 289 | 86 | 9.16 753 | 88 | 0.83 247 | 9.99 535 | 38 | 7 | 10.4 | 10.3 | 10.2 |
| 23 | 9.16 374 | 85 | 9.16 841 | 88 | 0.83 159 | 9.99 533 | 37 | 8 | 11.9 | 11.7 | 11.6 |
| 24 | 9.16 460 | 86 | 9.16 928 | 87 | 0.83 072 | 9.99 532 | 36 | 9 | 13.4 | 13.2 | 13.0 |
| 25 | 9.16 545 | 85 | 9.17 016 | 88 | 0.82 984 | 9.99 530 | 35 | 10 | 14.8 | 14.7 | 14.5 |
| 26 | 9.16 631 | 86 | 9.17 103 | 87 | 0.82 897 | 9.99 528 | 34 | 20 | 29.7 | 29.3 | 29.0 |
| 27 | 9.16 716 | 85 | 9.17 190 | 87 | 0.82 810 | 9.99 526 | 33 | 30 | 44.5 | 44.0 | 43.5 |
| 28 | 9.16 801 | 85 | 9.17 277 | 87 | 0.82 723 | 9.99 524 | 32 | 40 | 59.3 | 58.7 | 58.0 |
| 29 | 9.16 886 | 84 | 9.17 363 | 86 | 0.82 637 | 9.99 522 | 31 | 50 | 74.2 | 73.3 | 72.5 |
| 30 | 9.16 970 | 85 | 9.17 450 | 87 | 0.82 550 | 9.99 520 | 30 | " | 86 | 85 | 84 |
| 31 | 9.17 055 | 85 | 9.17 536 | 86 | 0.82 464 | 9.99 518 | 29 | 1 | 1.4 | 1.4 | 1.4 |
| 32 | 9.17 139 | 84 | 9.17 622 | 86 | 0.82 378 | 9.99 517 | 28 | 2 | 2.9 | 2.8 | 2.8 |
| 33 | 9.17 223 | 84 | 9.17 708 | 86 | 0.82 292 | 9.99 515 | 27 | 3 | 4.3 | 4.2 | 4.2 |
| 34 | 9.17 307 | 84 | 9.17 794 | 86 | 0.82 206 | 9.99 513 | 26 | 4 | 5.7 | 5.7 | 5.6 |
| 35 | 9.17 391 | 83 | 9.17 880 | 85 | 0.82 120 | 9.99 511 | 25 | 5 | 7.2 | 7.1 | 7.0 |
| 36 | 9.17 474 | 83 | 9.17 965 | 86 | 0.82 035 | 9.99 509 | 24 | 6 | 8.6 | 8.5 | 8.4 |
| 37 | 9.17 558 | 84 | 9.18 051 | 86 | 0.81 949 | 9.99 507 | 23 | 7 | 10.0 | 9.9 | 9.8 |
| 38 | 9.17 641 | 83 | 9.18 136 | 85 | 0.81 864 | 9.99 505 | 22 | 8 | 11.5 | 11.3 | 11.2 |
| 39 | 9.17 724 | 83 | 9.18 221 | 85 | 0.81 779 | 9.99 503 | 21 | 9 | 12.9 | 12.8 | 12.6 |
| 40 | 9.17 807 | 83 | 9.18 306 | 85 | 0.81 694 | 9.99 501 | 20 | 10 | 14.3 | 14.2 | 14.0 |
| 41 | 9.17 890 | 83 | 9.18 391 | 84 | 0.81 609 | 9.99 499 | 19 | 20 | 28.7 | 28.3 | 28.0 |
| 42 | 9.17 973 | 83 | 9.18 476 | 84 | 0.81 525 | 9.99 497 | 18 | 30 | 43.0 | 42.5 | 42.0 |
| 43 | 9.18 055 | 82 | 9.18 560 | 85 | 0.81 440 | 9.99 495 | 17 | 40 | 57.3 | 56.7 | 56.0 |
| 44 | 9.18 137 | 82 | 9.18 644 | 84 | 0.81 356 | 9.99 494 | 16 | 50 | 71.7 | 70.8 | 70.0 |
| 45 | 9.18 220 | 83 | 9.18 728 | 84 | 0.81 272 | 9.99 492 | 15 | " | 83 | 82 | 81 |
| 46 | 9.18 302 | 82 | 9.18 812 | 84 | 0.81 188 | 9.99 490 | 14 | 1 | 1.4 | 1.4 | 1.4 |
| 47 | 9.18 383 | 81 | 9.18 896 | 84 | 0.81 104 | 9.99 488 | 13 | 2 | 2.8 | 2.7 | 2.7 |
| 48 | 9.18 465 | 82 | 9.18 979 | 83 | 0.81 021 | 9.99 486 | 12 | 3 | 4.2 | 4.1 | 4.0 |
| 49 | 9.18 547 | 82 | 9.19 063 | 84 | 0.80 937 | 9.99 484 | 11 | 4 | 5.5 | 5.5 | 5.4 |
| 50 | 9.18 628 | 81 | 9.19 146 | 83 | 0.80 854 | 9.99 482 | 10 | 5 | 6.9 | 6.8 | 6.8 |
| 51 | 9.18 709 | 81 | 9.19 229 | 83 | 0.80 771 | 9.99 480 | 9 | 6 | 8.3 | 8.2 | 8.1 |
| 52 | 9.18 790 | 81 | 9.19 312 | 83 | 0.80 688 | 9.99 478 | 8 | 7 | 9.7 | 9.6 | 9.4 |
| 53 | 9.18 871 | 81 | 9.19 395 | 83 | 0.80 605 | 9.99 476 | 7 | 8 | 11.1 | 10.9 | 10.8 |
| 54 | 9.18 952 | 81 | 9.19 478 | 83 | 0.80 522 | 9.99 474 | 6 | 9 | 12.4 | 12.3 | 12.2 |
| 55 | 9.19 033 | 80 | 9.19 561 | 82 | 0.80 439 | 9.99 472 | 5 | 10 | 13.8 | 13.7 | 13.5 |
| 56 | 9.19 113 | 80 | 9.19 643 | 82 | 0.80 357 | 9.99 470 | 4 | 20 | 27.7 | 27.3 | 27.0 |
| 57 | 9.19 193 | 80 | 9.19 725 | 82 | 0.80 275 | 9.99 468 | 3 | 30 | 41.5 | 41.0 | 40.5 |
| 58 | 9.19 273 | 80 | 9.19 807 | 82 | 0.80 193 | 9.99 466 | 2 | 30 | 55.3 | 54.7 | 54.0 |
| 59 | 9.19 353 | 80 | 9.19 889 | 82 | 0.80 111 | 9.99 464 | 1 | 50 | 69.2 | 68.3 | 67.5 |
| 60 | 9.19 433 | 80 | 9.19 971 | 82 | 0.80 029 | 9.99 462 | 0 | | | | |
| | L. Cos. | d. | L. Cot. | c. d. | L. Tan. | L. Sin. | | | P. P. | | |

98° (278°)

(261°) 81°

LOGARITHMS OF THE FUNCTIONS (Continued)

9° (189°)

(350°) 170°

| | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | | P. P. | | | |
|----|----------|----|----------|------|----------|----------|----|-------|------|------|------|
| 0 | 9.19 433 | 80 | 9.19 971 | 82 | 0.80 029 | 9.99 462 | 60 | | | | |
| 1 | 9.19 513 | 79 | 9.20 053 | 81 | 0.79 947 | 9.99 460 | 59 | " | 80 | 79 | 78 |
| 2 | 9.19 592 | 79 | 9.20 134 | 81 | 0.79 866 | 9.99 458 | 58 | 1 | 1.3 | 1.3 | 1.3 |
| 3 | 9.19 672 | 80 | 9.20 216 | 82 | 0.79 784 | 9.99 456 | 57 | 2 | 2.7 | 2.6 | 2.6 |
| 4 | 9.19 751 | 79 | 9.20 297 | 81 | 0.79 703 | 9.99 454 | 56 | 3 | 4.0 | 4.0 | 3.9 |
| 5 | 9.19 830 | 79 | 9.20 378 | 81 | 0.79 622 | 9.99 452 | 55 | 4 | 5.3 | 5.3 | 5.2 |
| 6 | 9.19 909 | 79 | 9.20 459 | 81 | 0.79 541 | 9.99 450 | 54 | 5 | 6.7 | 6.6 | 6.5 |
| 7 | 9.19 988 | 79 | 9.20 540 | 81 | 0.79 460 | 9.99 448 | 53 | 6 | 8.0 | 7.9 | 7.8 |
| 8 | 9.20 067 | 79 | 9.20 621 | 81 | 0.79 379 | 9.99 446 | 52 | 7 | 9.3 | 9.2 | 9.1 |
| 9 | 9.20 145 | 78 | 9.20 701 | 80 | 0.79 299 | 9.99 444 | 51 | 8 | 10.7 | 10.5 | 10.4 |
| 10 | 9.20 223 | 78 | 9.20 782 | 81 | 0.79 218 | 9.99 442 | 50 | 9 | 12.0 | 11.8 | 11.7 |
| 11 | 9.20 302 | 79 | 9.20 862 | 80 | 0.79 138 | 9.99 440 | 49 | 10 | 13.3 | 13.2 | 13.0 |
| 12 | 9.20 380 | 78 | 9.20 942 | 80 | 0.79 058 | 9.99 438 | 48 | 20 | 26.7 | 26.3 | 26.0 |
| 13 | 9.20 458 | 78 | 9.21 022 | 80 | 0.78 978 | 9.99 436 | 47 | 30 | 40.0 | 39.5 | 39.0 |
| 14 | 9.20 535 | 77 | 9.21 102 | 80 | 0.78 898 | 9.99 434 | 46 | 40 | 53.3 | 52.7 | 52.0 |
| 15 | 9.20 613 | 78 | 9.21 182 | 80 | 0.78 818 | 9.99 432 | 45 | 50 | 66.7 | 65.8 | 65.0 |
| 16 | 9.20 691 | 78 | 9.21 261 | 79 | 0.78 739 | 9.99 429 | 44 | " | 76 | 75 | 74 |
| 17 | 9.20 768 | 77 | 9.21 341 | 80 | 0.78 659 | 9.99 427 | 43 | 1 | 1.3 | 1.2 | 1.2 |
| 18 | 9.20 845 | 77 | 9.21 420 | 79 | 0.78 580 | 9.99 425 | 42 | 2 | 2.5 | 2.5 | 2.5 |
| 19 | 9.20 922 | 77 | 9.21 499 | 79 | 0.78 501 | 9.99 423 | 41 | 3 | 3.8 | 3.8 | 3.7 |
| 20 | 9.20 999 | 77 | 9.21 578 | 79 | 0.78 422 | 9.99 421 | 40 | 4 | 5.1 | 5.0 | 4.9 |
| 21 | 9.21 076 | 77 | 9.21 657 | 79 | 0.78 343 | 9.99 419 | 39 | 5 | 6.3 | 6.2 | 6.2 |
| 22 | 9.21 153 | 77 | 9.21 736 | 79 | 0.78 264 | 9.99 417 | 38 | 6 | 7.6 | 7.5 | 7.4 |
| 23 | 9.21 229 | 76 | 9.21 814 | 78 | 0.78 186 | 9.99 415 | 37 | 7 | 8.9 | 8.8 | 8.6 |
| 24 | 9.21 306 | 77 | 9.21 893 | 79 | 0.78 107 | 9.99 413 | 36 | 8 | 10.1 | 10.0 | 9.9 |
| 25 | 9.21 382 | 76 | 9.21 971 | 78 | 0.78 029 | 9.99 411 | 35 | 9 | 11.4 | 11.2 | 11.1 |
| 26 | 9.21 458 | 76 | 9.22 049 | 78 | 0.77 951 | 9.99 409 | 34 | 10 | 12.7 | 12.5 | 12.3 |
| 27 | 9.21 534 | 76 | 9.22 127 | 78 | 0.77 873 | 9.99 407 | 33 | 20 | 25.3 | 25.0 | 24.7 |
| 28 | 9.21 610 | 75 | 9.22 205 | 78 | 0.77 795 | 9.99 404 | 32 | 30 | 38.0 | 37.5 | 37.0 |
| 29 | 9.21 685 | 76 | 9.22 283 | 78 | 0.77 717 | 9.99 402 | 31 | 40 | 50.7 | 50.0 | 49.3 |
| 30 | 9.21 761 | 75 | 9.22 361 | 77 | 0.77 639 | 9.99 400 | 30 | 50 | 63.3 | 62.5 | 61.7 |
| 31 | 9.21 836 | 76 | 9.22 438 | 77 | 0.77 562 | 9.99 398 | 29 | " | 72 | 71 | 3 |
| 32 | 9.21 912 | 75 | 9.22 516 | 78 | 0.77 484 | 9.99 396 | 28 | 1 | 1.2 | 1.2 | 0.0 |
| 33 | 9.21 987 | 75 | 9.22 593 | 77 | 0.77 407 | 9.99 394 | 27 | 2 | 2.4 | 2.4 | 0.1 |
| 34 | 9.22 062 | 75 | 9.22 670 | 77 | 0.77 330 | 9.99 392 | 26 | 3 | 3.6 | 3.6 | 0.2 |
| 35 | 9.22 137 | 74 | 9.22 747 | 77 | 0.77 253 | 9.99 390 | 25 | 4 | 4.8 | 4.7 | 0.2 |
| 36 | 9.22 211 | 74 | 9.22 824 | 77 | 0.77 176 | 9.99 388 | 24 | 5 | 6.0 | 5.9 | 0.2 |
| 37 | 9.22 286 | 75 | 9.22 901 | 77 | 0.77 099 | 9.99 385 | 23 | 6 | 7.2 | 7.1 | 0.3 |
| 38 | 9.22 361 | 75 | 9.22 977 | 77 | 0.77 023 | 9.99 383 | 22 | 7 | 8.4 | 8.3 | 0.4 |
| 39 | 9.22 435 | 74 | 9.23 054 | 76 | 0.76 946 | 9.99 381 | 21 | 8 | 9.6 | 9.5 | 0.4 |
| 40 | 9.22 509 | 74 | 9.23 130 | 76 | 0.76 870 | 9.99 379 | 20 | 9 | 10.8 | 10.6 | 0.4 |
| 41 | 9.22 583 | 74 | 9.23 206 | 77 | 0.76 794 | 9.99 377 | 19 | 10 | 12.0 | 11.8 | 0.5 |
| 42 | 9.22 657 | 74 | 9.23 283 | 76 | 0.76 717 | 9.99 375 | 18 | 20 | 24.0 | 23.7 | 1.0 |
| 43 | 9.22 731 | 74 | 9.23 359 | 76 | 0.76 641 | 9.99 372 | 17 | 30 | 36.0 | 35.5 | 1.5 |
| 44 | 9.22 805 | 73 | 9.23 435 | 75 | 0.76 565 | 9.99 370 | 16 | 40 | 48.0 | 47.3 | 2.0 |
| 45 | 9.22 878 | 73 | 9.23 510 | 76 | 0.76 490 | 9.99 368 | 15 | 50 | 60.0 | 59.2 | 2.5 |
| 46 | 9.22 952 | 74 | 9.23 586 | 76 | 0.76 414 | 9.99 366 | 14 | | | | |
| 47 | 9.23 025 | 73 | 9.23 661 | 75 | 0.76 339 | 9.99 364 | 13 | | | | |
| 48 | 9.23 098 | 73 | 9.23 737 | 76 | 0.76 263 | 9.99 362 | 12 | | | | |
| 49 | 9.23 171 | 73 | 9.23 812 | 75 | 0.76 188 | 9.99 359 | 11 | | | | |
| 50 | 9.23 244 | 73 | 9.23 887 | 75 | 0.76 113 | 9.99 357 | 10 | | | | |
| 51 | 9.23 317 | 73 | 9.23 962 | 75 | 0.76 038 | 9.99 355 | 9 | | | | |
| 52 | 9.23 390 | 73 | 9.24 037 | 75 | 0.75 963 | 9.99 353 | 8 | | | | |
| 53 | 9.23 462 | 72 | 9.24 112 | 75 | 0.75 888 | 9.99 351 | 7 | | | | |
| 54 | 9.23 535 | 73 | 9.24 186 | 74 | 0.75 814 | 9.99 348 | 6 | | | | |
| 55 | 9.23 607 | 72 | 9.24 261 | 75 | 0.75 739 | 9.99 346 | 5 | | | | |
| 56 | 9.23 679 | 72 | 9.24 335 | 74 | 0.75 665 | 9.99 344 | 4 | | | | |
| 57 | 9.23 752 | 73 | 9.24 410 | 75 | 0.75 590 | 9.99 342 | 3 | | | | |
| 58 | 9.23 823 | 71 | 9.24 484 | 74 | 0.75 516 | 9.99 340 | 2 | | | | |
| 59 | 9.23 895 | 72 | 9.24 558 | 74 | 0.75 442 | 9.99 337 | 1 | | | | |
| 60 | 9.23 967 | 72 | 9.24 632 | 74 | 0.75 368 | 9.99 335 | 0 | | | | |
| | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | | P. P. | | | |

99° (279°)

(260°) 80°

LOGARITHMS OF THE FUNCTIONS (Continued)

10° (190°)

(349°) 169°

| ' | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | ' | P. P. | | |
|----|----------|----|----------|------|----------|----------|----|----|-------|------|------|
| 0 | 9.23 967 | 72 | 9.24 632 | 74 | 0.75 368 | 9.99 335 | 2 | 60 | | | |
| 1 | 9.24 039 | 71 | 9.24 706 | 73 | 0.75 294 | 9.99 333 | 2 | 59 | " | 74 | 73 |
| 2 | 9.24 110 | 71 | 9.24 779 | 73 | 0.75 221 | 9.99 331 | 2 | 58 | 1 | 1.2 | 1.2 |
| 3 | 9.24 181 | 72 | 9.24 853 | 74 | 0.75 147 | 9.99 328 | 2 | 57 | 2 | 2.5 | 2.4 |
| 4 | 9.24 253 | 71 | 9.24 926 | 74 | 0.75 074 | 9.99 326 | 2 | 56 | 3 | 3.7 | 3.6 |
| 5 | 9.24 324 | 71 | 9.25 000 | 73 | 0.75 000 | 9.99 324 | 2 | 55 | 4 | 4.9 | 4.9 |
| 6 | 9.24 395 | 71 | 9.25 073 | 73 | 0.74 927 | 9.99 322 | 2 | 54 | 5 | 6.2 | 6.1 |
| 7 | 9.24 466 | 70 | 9.25 146 | 73 | 0.74 854 | 9.99 319 | 2 | 53 | 6 | 7.4 | 7.3 |
| 8 | 9.24 535 | 71 | 9.25 219 | 73 | 0.74 781 | 9.99 317 | 2 | 52 | 7 | 8.6 | 8.5 |
| 9 | 9.24 607 | 70 | 9.25 292 | 73 | 0.74 708 | 9.99 315 | 2 | 51 | 8 | 9.9 | 9.7 |
| 10 | 9.24 677 | 71 | 9.25 365 | 72 | 0.74 635 | 9.99 313 | 2 | 50 | 9 | 11.1 | 11.0 |
| 11 | 9.24 748 | 70 | 9.25 437 | 73 | 0.74 563 | 9.99 310 | 2 | 49 | 10 | 12.3 | 12.2 |
| 12 | 9.24 818 | 70 | 9.25 510 | 72 | 0.74 490 | 9.99 308 | 2 | 48 | 20 | 24.7 | 24.3 |
| 13 | 9.24 888 | 70 | 9.25 582 | 73 | 0.74 418 | 9.99 306 | 2 | 47 | 30 | 37.0 | 36.5 |
| 14 | 9.24 958 | 70 | 9.25 655 | 72 | 0.74 345 | 9.99 304 | 2 | 46 | 40 | 49.3 | 48.7 |
| 15 | 9.25 028 | 70 | 9.25 727 | 72 | 0.74 273 | 9.99 301 | 2 | 45 | 50 | 61.7 | 60.8 |
| 16 | 9.25 098 | 70 | 9.25 799 | 72 | 0.74 201 | 9.99 299 | 2 | 44 | " | 71 | 70 |
| 17 | 9.25 168 | 69 | 9.25 871 | 72 | 0.74 129 | 9.99 297 | 2 | 43 | 1 | 1.2 | 1.2 |
| 18 | 9.25 237 | 70 | 9.25 943 | 72 | 0.74 057 | 9.99 294 | 2 | 42 | 2 | 2.4 | 2.3 |
| 19 | 9.25 307 | 69 | 9.26 015 | 71 | 0.73 985 | 9.99 292 | 2 | 41 | 3 | 3.6 | 3.5 |
| 20 | 9.25 376 | 69 | 9.26 086 | 72 | 0.73 914 | 9.99 290 | 2 | 40 | 4 | 4.7 | 4.7 |
| 21 | 9.25 445 | 69 | 9.26 158 | 71 | 0.73 842 | 9.99 288 | 2 | 39 | 5 | 5.9 | 5.8 |
| 22 | 9.25 514 | 69 | 9.26 229 | 72 | 0.73 771 | 9.99 285 | 2 | 38 | 6 | 7.1 | 7.0 |
| 23 | 9.25 583 | 69 | 9.26 301 | 71 | 0.73 699 | 9.99 283 | 2 | 37 | 7 | 8.3 | 8.2 |
| 24 | 9.25 652 | 69 | 9.26 372 | 71 | 0.73 628 | 9.99 281 | 2 | 36 | 8 | 9.5 | 9.3 |
| 25 | 9.25 721 | 69 | 9.26 443 | 71 | 0.73 557 | 9.99 278 | 2 | 35 | 9 | 10.6 | 10.5 |
| 26 | 9.25 790 | 68 | 9.26 514 | 71 | 0.73 486 | 9.99 276 | 2 | 34 | 10 | 11.8 | 11.7 |
| 27 | 9.25 858 | 69 | 9.26 585 | 70 | 0.73 415 | 9.99 274 | 2 | 33 | 20 | 23.7 | 23.3 |
| 28 | 9.25 927 | 68 | 9.26 655 | 71 | 0.73 345 | 9.99 271 | 2 | 32 | 30 | 35.5 | 35.0 |
| 29 | 9.25 995 | 68 | 9.26 726 | 71 | 0.73 274 | 9.99 269 | 2 | 31 | 40 | 47.3 | 46.7 |
| 30 | 9.26 063 | 68 | 9.26 797 | 70 | 0.73 203 | 9.99 267 | 2 | 30 | 50 | 59.2 | 58.3 |
| 31 | 9.26 131 | 68 | 9.26 867 | 70 | 0.73 133 | 9.99 264 | 2 | 29 | " | 68 | 67 |
| 32 | 9.26 199 | 68 | 9.26 937 | 71 | 0.73 063 | 9.99 262 | 2 | 28 | 1 | 1.1 | 1.1 |
| 33 | 9.26 267 | 68 | 9.27 008 | 70 | 0.72 992 | 9.99 260 | 2 | 27 | 2 | 2.3 | 2.2 |
| 34 | 9.26 335 | 68 | 9.27 078 | 70 | 0.72 922 | 9.99 257 | 2 | 26 | 3 | 3.4 | 3.4 |
| 35 | 9.26 403 | 67 | 9.27 148 | 70 | 0.72 852 | 9.99 255 | 2 | 25 | 4 | 4.5 | 4.5 |
| 36 | 9.26 470 | 68 | 9.27 218 | 70 | 0.72 782 | 9.99 252 | 2 | 24 | 5 | 5.7 | 5.6 |
| 37 | 9.26 538 | 67 | 9.27 288 | 70 | 0.72 712 | 9.99 250 | 2 | 23 | 6 | 6.8 | 6.7 |
| 38 | 9.26 605 | 67 | 9.27 357 | 69 | 0.72 643 | 9.99 248 | 2 | 22 | 7 | 7.9 | 7.8 |
| 39 | 9.26 672 | 67 | 9.27 427 | 69 | 0.72 573 | 9.99 245 | 2 | 21 | 8 | 9.1 | 8.9 |
| 40 | 9.26 739 | 67 | 9.27 496 | 70 | 0.72 504 | 9.99 243 | 2 | 20 | 9 | 10.2 | 10.0 |
| 41 | 9.26 806 | 67 | 9.27 566 | 70 | 0.72 434 | 9.99 241 | 2 | 19 | 10 | 11.3 | 11.2 |
| 42 | 9.26 873 | 67 | 9.27 635 | 69 | 0.72 365 | 9.99 238 | 2 | 18 | 20 | 22.7 | 22.3 |
| 43 | 9.26 940 | 67 | 9.27 704 | 69 | 0.72 296 | 9.99 236 | 2 | 17 | 30 | 34.0 | 33.5 |
| 44 | 9.27 007 | 66 | 9.27 773 | 69 | 0.72 227 | 9.99 233 | 2 | 16 | 40 | 45.3 | 44.7 |
| 45 | 9.27 073 | 67 | 9.27 842 | 69 | 0.72 158 | 9.99 231 | 2 | 15 | 50 | 56.7 | 55.8 |
| 46 | 9.27 140 | 66 | 9.27 911 | 69 | 0.72 089 | 9.99 229 | 2 | 14 | " | 68 | 67 |
| 47 | 9.27 206 | 66 | 9.27 980 | 69 | 0.72 020 | 9.99 226 | 2 | 13 | 1 | 1.1 | 1.1 |
| 48 | 9.27 273 | 66 | 9.28 049 | 68 | 0.71 951 | 9.99 224 | 2 | 12 | 2 | 2.3 | 2.2 |
| 49 | 9.27 339 | 66 | 9.28 117 | 69 | 0.71 883 | 9.99 221 | 2 | 11 | 3 | 3.4 | 3.4 |
| 50 | 9.27 405 | 66 | 9.28 186 | 68 | 0.71 814 | 9.99 219 | 2 | 10 | 4 | 4.5 | 4.5 |
| 51 | 9.27 471 | 66 | 9.28 254 | 69 | 0.71 746 | 9.99 217 | 2 | 9 | 5 | 5.7 | 5.6 |
| 52 | 9.27 537 | 65 | 9.28 323 | 68 | 0.71 677 | 9.99 214 | 2 | 8 | 6 | 6.8 | 6.7 |
| 53 | 9.27 602 | 66 | 9.28 391 | 68 | 0.71 609 | 9.99 212 | 2 | 7 | 7 | 7.9 | 7.8 |
| 54 | 9.27 668 | 66 | 9.28 459 | 68 | 0.71 541 | 9.99 209 | 2 | 6 | 8 | 9.1 | 8.9 |
| 55 | 9.27 734 | 65 | 9.28 527 | 68 | 0.71 473 | 9.99 207 | 2 | 5 | 9 | 10.2 | 10.0 |
| 56 | 9.27 799 | 65 | 9.28 595 | 67 | 0.71 405 | 9.99 204 | 2 | 4 | 10 | 11.3 | 11.2 |
| 57 | 9.27 864 | 66 | 9.28 662 | 68 | 0.71 338 | 9.99 202 | 2 | 3 | 20 | 22.7 | 22.3 |
| 58 | 9.27 930 | 65 | 9.28 730 | 68 | 0.71 270 | 9.99 200 | 2 | 2 | 30 | 34.0 | 33.5 |
| 59 | 9.27 995 | 65 | 9.28 798 | 67 | 0.71 202 | 9.99 197 | 2 | 1 | 40 | 45.3 | 44.7 |
| 60 | 9.28 060 | 65 | 9.28 865 | 67 | 0.71 135 | 9.99 195 | 2 | 0 | 50 | 56.7 | 55.8 |
| ' | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | ' | P. P. | | |

100° (280°)

(259°) 79°

LOGARITHMS OF THE FUNCTIONS (Continued)

11° (191°)

(348°) 168°

| | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | | P. P. |
|----|----------|----|----------|------|----------|----------|----|----|-------------------|
| 0 | 9.28 060 | | 9.28 865 | 68 | 0.71 135 | 9.99 195 | 3 | 60 | |
| 1 | 9.28 125 | 65 | 9.28 933 | 67 | 0.71 067 | 9.99 192 | 3 | 59 | " 65 64 63 |
| 2 | 9.28 190 | 65 | 9.29 000 | 67 | 0.71 000 | 9.99 190 | 2 | 58 | 1 1.1 1.1 1.0 |
| 3 | 9.28 254 | 64 | 9.29 067 | 67 | 0.70 933 | 9.99 187 | 3 | 57 | 2 2.2 2.1 2.1 |
| 4 | 9.28 319 | 65 | 9.29 134 | 67 | 0.70 866 | 9.99 185 | 2 | 56 | 3 3.2 3.2 3.2 |
| 5 | 9.28 384 | 65 | 9.29 201 | 67 | 0.70 799 | 9.99 182 | 3 | 55 | 4 4.3 4.3 4.2 |
| 6 | 9.28 448 | 64 | 9.29 268 | 67 | 0.70 732 | 9.99 180 | 2 | 54 | 5 5.4 5.3 5.2 |
| 7 | 9.28 512 | 64 | 9.29 335 | 67 | 0.70 665 | 9.99 177 | 3 | 53 | 6 6.5 6.4 6.3 |
| 8 | 9.28 577 | 65 | 9.29 402 | 67 | 0.70 598 | 9.99 175 | 2 | 52 | 7 7.6 7.5 7.4 |
| 9 | 9.28 641 | 64 | 9.29 468 | 66 | 0.70 532 | 9.99 172 | 3 | 51 | 8 8.7 8.6 8.4 |
| 10 | 9.28 705 | 64 | 9.29 535 | 67 | 0.70 465 | 9.99 170 | 2 | 50 | 9 9.8 9.6 9.4 |
| 11 | 9.28 769 | 64 | 9.29 601 | 66 | 0.70 399 | 9.99 167 | 3 | 49 | 10 10.8 10.7 10.5 |
| 12 | 9.28 833 | 64 | 9.29 668 | 67 | 0.70 332 | 9.99 165 | 2 | 48 | 20 21.7 21.3 21.0 |
| 13 | 9.28 896 | 63 | 9.29 734 | 66 | 0.70 265 | 9.99 162 | 3 | 47 | 30 32.5 32.0 31.5 |
| 14 | 9.28 960 | 64 | 9.29 800 | 66 | 0.70 200 | 9.99 160 | 2 | 46 | 40 43.3 42.7 42.0 |
| 15 | 9.29 024 | 64 | 9.29 866 | 66 | 0.70 134 | 9.99 157 | 3 | 45 | 50 54.2 53.3 52.5 |
| 16 | 9.29 087 | 63 | 9.29 932 | 66 | 0.70 068 | 9.99 155 | 2 | 44 | " 62 61 60 |
| 17 | 9.29 150 | 63 | 9.29 998 | 66 | 0.70 002 | 9.99 152 | 3 | 43 | 1 1.0 1.0 1.0 |
| 18 | 9.29 214 | 64 | 9.30 064 | 66 | 0.69 936 | 9.99 150 | 2 | 42 | 2 2.1 2.0 2.0 |
| 19 | 9.29 277 | 63 | 9.30 130 | 66 | 0.69 870 | 9.99 147 | 3 | 41 | 3 3.1 3.0 3.0 |
| 20 | 9.29 340 | 63 | 9.30 195 | 66 | 0.69 805 | 9.99 145 | 2 | 40 | 4 4.1 4.1 4.0 |
| 21 | 9.29 403 | 63 | 9.30 261 | 65 | 0.69 739 | 9.99 142 | 3 | 39 | 5 5.2 5.1 5.0 |
| 22 | 9.29 466 | 63 | 9.30 326 | 65 | 0.69 674 | 9.99 140 | 2 | 38 | 6 6.2 6.1 6.0 |
| 23 | 9.29 529 | 63 | 9.30 391 | 65 | 0.69 609 | 9.99 137 | 3 | 37 | 7 7.2 7.1 7.0 |
| 24 | 9.29 591 | 62 | 9.30 457 | 66 | 0.69 543 | 9.99 135 | 2 | 36 | 8 8.3 8.1 8.0 |
| 25 | 9.29 654 | 63 | 9.30 522 | 65 | 0.69 478 | 9.99 132 | 3 | 35 | 9 9.3 9.2 9.0 |
| 26 | 9.29 716 | 62 | 9.30 587 | 65 | 0.69 413 | 9.99 130 | 2 | 34 | 10 10.3 10.2 10.0 |
| 27 | 9.29 779 | 63 | 9.30 652 | 65 | 0.69 348 | 9.99 127 | 3 | 33 | 20 20.7 20.3 20.0 |
| 28 | 9.29 841 | 62 | 9.30 717 | 65 | 0.69 283 | 9.99 124 | 2 | 32 | 30 31.0 30.5 30.0 |
| 29 | 9.29 903 | 63 | 9.30 782 | 65 | 0.69 218 | 9.99 122 | 3 | 31 | 40 41.3 40.7 40.0 |
| 30 | 9.29 966 | 62 | 9.30 846 | 65 | 0.69 154 | 9.99 119 | 2 | 30 | 50 51.7 50.8 50.0 |
| 31 | 9.30 028 | 62 | 9.30 911 | 65 | 0.69 089 | 9.99 117 | 3 | 29 | " 59 3 2 |
| 32 | 9.30 090 | 62 | 9.30 975 | 64 | 0.69 025 | 9.99 114 | 2 | 28 | 1 1.0 0.0 0.0 |
| 33 | 9.30 151 | 61 | 9.31 040 | 65 | 0.68 960 | 9.99 112 | 3 | 27 | 2 2.0 0.1 0.1 |
| 34 | 9.30 213 | 62 | 9.31 104 | 64 | 0.68 896 | 9.99 109 | 2 | 26 | 3 3.0 0.2 0.1 |
| 35 | 9.30 275 | 61 | 9.31 168 | 65 | 0.68 832 | 9.99 106 | 3 | 25 | 4 3.9 0.2 0.1 |
| 36 | 9.30 336 | 62 | 9.31 233 | 65 | 0.68 767 | 9.99 104 | 2 | 24 | 5 4.9 0.2 0.2 |
| 37 | 9.30 398 | 61 | 9.31 297 | 64 | 0.68 703 | 9.99 101 | 3 | 23 | 6 5.9 0.3 0.2 |
| 38 | 9.30 459 | 61 | 9.31 361 | 64 | 0.68 639 | 9.99 099 | 2 | 22 | 7 6.9 0.4 0.2 |
| 39 | 9.30 521 | 62 | 9.31 425 | 64 | 0.68 575 | 9.99 096 | 3 | 21 | 8 7.9 0.4 0.3 |
| 40 | 9.30 582 | 61 | 9.31 489 | 64 | 0.68 511 | 9.99 093 | 2 | 20 | 9 8.8 0.4 0.3 |
| 41 | 9.30 643 | 61 | 9.31 552 | 63 | 0.68 448 | 9.99 091 | 3 | 19 | 10 9.8 0.5 0.3 |
| 42 | 9.30 704 | 61 | 9.31 616 | 64 | 0.68 384 | 9.99 088 | 2 | 18 | 20 19.7 1.0 0.7 |
| 43 | 9.30 765 | 61 | 9.31 679 | 63 | 0.68 321 | 9.99 086 | 3 | 17 | 30 29.5 1.5 1.0 |
| 44 | 9.30 826 | 61 | 9.31 743 | 64 | 0.68 257 | 9.99 083 | 2 | 16 | 40 39.3 2.0 1.3 |
| 45 | 9.30 887 | 60 | 9.31 806 | 63 | 0.68 194 | 9.99 080 | 3 | 15 | 50 49.2 2.5 1.7 |
| 46 | 9.30 947 | 61 | 9.31 870 | 64 | 0.68 130 | 9.99 078 | 2 | 14 | |
| 47 | 9.31 008 | 60 | 9.31 933 | 63 | 0.68 067 | 9.99 075 | 3 | 13 | |
| 48 | 9.31 068 | 60 | 9.31 996 | 63 | 0.68 004 | 9.99 072 | 2 | 12 | |
| 49 | 9.31 129 | 61 | 9.32 059 | 63 | 0.67 941 | 9.99 070 | 3 | 11 | |
| 50 | 9.31 189 | 61 | 9.32 122 | 63 | 0.67 878 | 9.99 067 | 2 | 10 | |
| 51 | 9.31 250 | 60 | 9.32 185 | 63 | 0.67 815 | 9.99 064 | 3 | 9 | 0 11.2 11.0 10.8 |
| 52 | 9.31 310 | 60 | 9.32 248 | 63 | 0.67 752 | 9.99 062 | 2 | 8 | 1 33.5 33.0 32.5 |
| 53 | 9.31 370 | 60 | 9.32 311 | 63 | 0.67 689 | 9.99 059 | 3 | 7 | 2 55.8 55.0 54.2 |
| 54 | 9.31 430 | 60 | 9.32 373 | 62 | 0.67 627 | 9.99 056 | 2 | 6 | |
| 55 | 9.31 490 | 59 | 9.32 436 | 62 | 0.67 564 | 9.99 054 | 3 | 5 | |
| 56 | 9.31 549 | 60 | 9.32 498 | 63 | 0.67 502 | 9.99 051 | 2 | 4 | |
| 57 | 9.31 609 | 60 | 9.32 561 | 62 | 0.67 439 | 9.99 048 | 3 | 3 | |
| 58 | 9.31 669 | 59 | 9.32 623 | 62 | 0.67 377 | 9.99 046 | 2 | 2 | |
| 59 | 9.31 728 | 60 | 9.32 685 | 62 | 0.67 315 | 9.99 043 | 3 | 1 | |
| 60 | 9.31 788 | 60 | 9.32 747 | 62 | 0.67 253 | 9.99 040 | 2 | 0 | |
| | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | | P. P. |

101° (281°)

(258°) 78°

LOGARITHMS OF THE FUNCTIONS (Continued)

12° (192°)

(347°) 167°

| | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | | P. P. |
|----|----------|----|----------|------|----------|----------|----|----|-------------------|
| 0 | 9.31 788 | | 9.32 747 | 63 | 0.67 253 | 9.99 040 | | 60 | |
| 1 | 9.31 847 | 59 | 9.32 810 | 62 | 0.67 190 | 9.99 038 | 2 | 59 | " 63 62 61 |
| 2 | 9.31 907 | 60 | 9.32 872 | 61 | 0.67 128 | 9.99 035 | 3 | 58 | 1 1.0 1.0 1.0 |
| 3 | 9.31 966 | 59 | 9.32 933 | 62 | 0.67 067 | 9.99 032 | 3 | 57 | 2 2.1 2.1 2.0 |
| 4 | 9.32 025 | 59 | 9.32 995 | 62 | 0.67 005 | 9.99 030 | 2 | 56 | 3 3.2 3.1 3.0 |
| 5 | 9.32 084 | 59 | 9.33 057 | 62 | 0.66 943 | 9.99 027 | 3 | 55 | 4 4.2 4.1 4.1 |
| 6 | 9.32 143 | 59 | 9.33 119 | 61 | 0.66 881 | 9.99 024 | 3 | 54 | 5 5.2 5.2 5.1 |
| 7 | 9.32 202 | 59 | 9.33 180 | 61 | 0.66 820 | 9.99 022 | 2 | 53 | 6 6.3 6.2 6.1 |
| 8 | 9.32 261 | 59 | 9.33 242 | 62 | 0.66 758 | 9.99 019 | 3 | 52 | 7 7.4 7.2 7.1 |
| 9 | 9.32 319 | 58 | 9.33 303 | 61 | 0.66 697 | 9.99 016 | 3 | 51 | 8 8.4 8.3 8.1 |
| 10 | 9.32 378 | 59 | 9.33 365 | 62 | 0.66 635 | 9.99 013 | 2 | 50 | 9 9.4 9.3 9.2 |
| 11 | 9.32 437 | 58 | 9.33 426 | 61 | 0.66 574 | 9.99 011 | 3 | 49 | 10 10.5 10.3 10.2 |
| 12 | 9.32 495 | 58 | 9.33 487 | 61 | 0.66 513 | 9.99 008 | 3 | 48 | 20 21.0 20.7 20.3 |
| 13 | 9.32 553 | 58 | 9.33 548 | 61 | 0.66 452 | 9.99 005 | 3 | 47 | 30 31.5 31.0 30.5 |
| 14 | 9.32 612 | 59 | 9.33 609 | 61 | 0.66 391 | 9.99 002 | 3 | 46 | 40 42.0 41.3 40.7 |
| 15 | 9.32 670 | 58 | 9.33 670 | 61 | 0.66 330 | 9.99 000 | 2 | 45 | 50 52.5 51.7 50.8 |
| 16 | 9.32 728 | 58 | 9.33 731 | 61 | 0.66 269 | 9.98 997 | 3 | 44 | " 60 59 58 |
| 17 | 9.32 786 | 58 | 9.33 792 | 61 | 0.66 208 | 9.98 994 | 3 | 43 | 1 1.0 1.0 1.0 |
| 18 | 9.32 844 | 58 | 9.33 853 | 61 | 0.66 147 | 9.98 991 | 3 | 42 | 2 2.0 2.0 1.9 |
| 19 | 9.32 902 | 58 | 9.33 913 | 60 | 0.66 087 | 9.98 989 | 2 | 41 | 3 3.0 3.0 2.9 |
| 20 | 9.32 960 | 58 | 9.33 974 | 61 | 0.66 026 | 9.98 986 | 3 | 40 | 4 4.0 3.9 3.9 |
| 21 | 9.33 018 | 57 | 9.34 034 | 60 | 0.65 966 | 9.98 983 | 3 | 39 | 5 5.0 4.9 4.8 |
| 22 | 9.33 075 | 57 | 9.34 095 | 61 | 0.65 905 | 9.98 980 | 3 | 38 | 6 6.0 5.9 5.8 |
| 23 | 9.33 133 | 58 | 9.34 155 | 60 | 0.65 845 | 9.98 978 | 2 | 37 | 7 7.0 6.9 6.8 |
| 24 | 9.33 190 | 57 | 9.34 215 | 61 | 0.65 785 | 9.98 975 | 3 | 36 | 8 8.0 7.9 7.7 |
| 25 | 9.33 248 | 57 | 9.34 276 | 60 | 0.65 724 | 9.98 972 | 3 | 35 | 9 9.0 8.8 8.7 |
| 26 | 9.33 305 | 57 | 9.34 336 | 60 | 0.65 664 | 9.98 969 | 3 | 34 | 10 10.0 9.8 9.7 |
| 27 | 9.33 362 | 57 | 9.34 396 | 60 | 0.65 604 | 9.98 967 | 2 | 33 | 20 20.0 19.7 19.3 |
| 28 | 9.33 420 | 58 | 9.34 456 | 60 | 0.65 544 | 9.98 964 | 3 | 32 | 30 30.0 29.5 29.0 |
| 29 | 9.33 477 | 57 | 9.34 516 | 60 | 0.65 484 | 9.98 961 | 3 | 31 | 40 40.0 39.3 38.7 |
| 30 | 9.33 534 | 57 | 9.34 576 | 60 | 0.65 424 | 9.98 958 | 3 | 30 | 50 50.0 49.2 48.3 |
| 31 | 9.33 591 | 57 | 9.34 635 | 59 | 0.65 365 | 9.98 955 | 2 | 29 | " 57 56 55 |
| 32 | 9.33 647 | 56 | 9.34 695 | 60 | 0.65 305 | 9.98 953 | 2 | 28 | 1 1.0 0.9 0.9 |
| 33 | 9.33 704 | 57 | 9.34 755 | 60 | 0.65 245 | 9.98 950 | 3 | 27 | 2 1.9 1.9 1.8 |
| 34 | 9.33 761 | 57 | 9.34 814 | 59 | 0.65 186 | 9.98 947 | 3 | 26 | 3 2.8 2.8 2.8 |
| 35 | 9.33 818 | 56 | 9.34 874 | 59 | 0.65 126 | 9.98 944 | 3 | 25 | 4 3.8 3.7 3.7 |
| 36 | 9.33 874 | 56 | 9.34 933 | 59 | 0.65 067 | 9.98 941 | 3 | 24 | 5 4.8 4.7 4.6 |
| 37 | 9.33 931 | 57 | 9.34 992 | 59 | 0.65 008 | 9.98 938 | 3 | 23 | 6 5.7 5.6 5.5 |
| 38 | 9.33 987 | 56 | 9.35 051 | 59 | 0.64 949 | 9.98 936 | 2 | 22 | 7 6.6 6.5 6.4 |
| 39 | 9.34 043 | 56 | 9.35 111 | 60 | 0.64 889 | 9.98 933 | 3 | 21 | 8 7.6 7.5 7.3 |
| 40 | 9.34 100 | 57 | 9.35 170 | 59 | 0.64 830 | 9.98 930 | 3 | 20 | 9 8.6 8.4 8.2 |
| 41 | 9.34 156 | 56 | 9.35 229 | 59 | 0.64 771 | 9.98 927 | 3 | 19 | 10 9.5 9.3 9.2 |
| 42 | 9.34 212 | 56 | 9.35 288 | 59 | 0.64 712 | 9.98 924 | 3 | 18 | 20 19.0 18.7 18.3 |
| 43 | 9.34 268 | 56 | 9.35 347 | 59 | 0.64 653 | 9.98 921 | 2 | 17 | 30 28.5 28.0 27.5 |
| 44 | 9.34 324 | 56 | 9.35 405 | 58 | 0.64 595 | 9.98 919 | 2 | 16 | 40 38.0 37.3 36.7 |
| 45 | 9.34 380 | 56 | 9.35 464 | 59 | 0.64 536 | 9.98 916 | 3 | 15 | 50 47.5 46.7 45.8 |
| 46 | 9.34 436 | 56 | 9.35 523 | 59 | 0.64 477 | 9.98 913 | 3 | 14 | |
| 47 | 9.34 491 | 55 | 9.35 581 | 58 | 0.64 419 | 9.98 910 | 3 | 13 | |
| 48 | 9.34 547 | 56 | 9.35 640 | 59 | 0.64 360 | 9.98 907 | 3 | 12 | |
| 49 | 9.34 602 | 55 | 9.35 698 | 58 | 0.64 302 | 9.98 904 | 3 | 11 | |
| 50 | 9.34 658 | 56 | 9.35 757 | 59 | 0.64 243 | 9.98 901 | 3 | 10 | |
| 51 | 9.34 713 | 55 | 9.35 815 | 58 | 0.64 185 | 9.98 898 | 3 | 9 | |
| 52 | 9.34 769 | 56 | 9.35 873 | 58 | 0.64 127 | 9.98 896 | 2 | 8 | |
| 53 | 9.34 824 | 55 | 9.35 931 | 58 | 0.64 069 | 9.98 893 | 3 | 7 | |
| 54 | 9.34 879 | 55 | 9.35 989 | 58 | 0.64 011 | 9.98 890 | 3 | 6 | |
| 55 | 9.34 934 | 55 | 9.36 047 | 58 | 0.63 953 | 9.98 887 | 3 | 5 | |
| 56 | 9.34 989 | 55 | 9.36 105 | 58 | 0.63 895 | 9.98 884 | 3 | 4 | |
| 57 | 9.35 044 | 55 | 9.36 163 | 58 | 0.63 837 | 9.98 881 | 3 | 3 | |
| 58 | 9.35 099 | 55 | 9.36 221 | 58 | 0.63 779 | 9.98 878 | 3 | 2 | |
| 59 | 9.35 154 | 55 | 9.36 279 | 58 | 0.63 721 | 9.98 875 | 3 | 1 | |
| 60 | 9.35 209 | 55 | 9.36 336 | 57 | 0.63 664 | 9.98 872 | 3 | 0 | |
| | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | | P. P. |

102° (282°)

(257°) 77°

LOGARITHMS OF THE FUNCTIONS (Continued)

13° (193°)

(346°) 166°

| ' | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | ' | P. P. |
|----|----------|----|----------|------|----------|----------|----|----|---------------------|
| 0 | 9.35 209 | | 9.36 336 | | 0.63 664 | 9.98 872 | | 60 | |
| 1 | 9.35 263 | 54 | 9.36 394 | 58 | 0.63 606 | 9.98 869 | 3 | 59 | " |
| 2 | 9.35 318 | 55 | 9.36 452 | 58 | 0.63 548 | 9.98 867 | 2 | 58 | 1 57 56 55 |
| 3 | 9.35 373 | 55 | 9.36 509 | 57 | 0.63 491 | 9.98 864 | 3 | 57 | 2 1.0 0.9 0.9 |
| 4 | 9.35 427 | 54 | 9.36 566 | 57 | 0.63 434 | 9.98 861 | 3 | 56 | 3 1.9 1.9 1.8 |
| 5 | 9.35 481 | 54 | 9.36 624 | 58 | | | 3 | 55 | 4 2.8 2.8 2.8 |
| 6 | 9.35 536 | 55 | 9.36 681 | 57 | 0.63 376 | 9.98 858 | 3 | 54 | 5 3.8 3.7 3.7 |
| 7 | 9.35 590 | 54 | 9.36 738 | 57 | 0.63 319 | 9.98 855 | 3 | 53 | 6 4.8 4.7 4.6 |
| 8 | 9.35 644 | 54 | 9.36 795 | 57 | 0.63 262 | 9.98 852 | 3 | 52 | 7 5.7 5.6 5.5 |
| 9 | 9.35 698 | 54 | 9.36 852 | 57 | 0.63 205 | 9.98 849 | 3 | 51 | 8 6.6 6.5 6.4 |
| 10 | 9.35 752 | 54 | 9.36 909 | 57 | 0.63 148 | 9.98 846 | 3 | 50 | 9 7.6 7.5 7.3 |
| 11 | 9.35 806 | 54 | 9.36 966 | 57 | 0.63 091 | 9.98 843 | 3 | 49 | 10 8.6 8.4 8.2 |
| 12 | 9.35 860 | 54 | 9.37 023 | 57 | 0.63 034 | 9.98 840 | 3 | 48 | 19.0 9.5 9.3 9.2 |
| 13 | 9.35 914 | 54 | 9.37 080 | 57 | 0.62 977 | 9.98 837 | 3 | 47 | 20 18.7 18.7 18.3 |
| 14 | 9.35 968 | 54 | 9.37 137 | 57 | 0.62 920 | 9.98 834 | 3 | 46 | 30 28.5 28.0 27.5 |
| 15 | 9.36 022 | 54 | 9.37 193 | 56 | 0.62 863 | 9.98 831 | 3 | 45 | 40 38.0 37.3 36.7 |
| 16 | 9.36 075 | 53 | 9.37 250 | 57 | 0.62 807 | 9.98 828 | 3 | 44 | 50 47.5 46.7 45.8 |
| 17 | 9.36 129 | 54 | 9.37 306 | 56 | 0.62 750 | 9.98 825 | 3 | 43 | " 54 53 52 |
| 18 | 9.36 182 | 53 | 9.37 363 | 57 | 0.62 694 | 9.98 822 | 3 | 42 | 1 0.9 0.9 0.9 |
| 19 | 9.36 236 | 53 | 9.37 419 | 56 | 0.62 637 | 9.98 819 | 3 | 41 | 2 1.8 1.8 1.7 |
| 20 | 9.36 289 | 53 | 9.37 476 | 57 | 0.62 581 | 9.98 816 | 3 | 40 | 3 2.7 2.6 2.6 |
| 21 | 9.36 342 | 53 | 9.37 532 | 56 | 0.62 524 | 9.98 813 | 3 | 39 | 4 3.6 3.5 3.5 |
| 22 | 9.36 395 | 53 | 9.37 588 | 56 | 0.62 468 | 9.98 810 | 3 | 38 | 5 4.5 4.4 4.3 |
| 23 | 9.36 449 | 54 | 9.37 644 | 56 | 0.62 412 | 9.98 807 | 3 | 37 | 6 5.4 5.3 5.2 |
| 24 | 9.36 502 | 53 | 9.37 700 | 56 | 0.62 356 | 9.98 804 | 3 | 36 | 7 6.3 6.2 6.1 |
| 25 | 9.36 555 | 53 | 9.37 756 | 56 | 0.62 300 | 9.98 801 | 3 | 35 | 8 7.2 7.1 6.9 |
| 26 | 9.36 608 | 53 | 9.37 812 | 56 | 0.62 244 | 9.98 798 | 3 | 34 | 9 8.1 8.0 7.8 |
| 27 | 9.36 660 | 52 | 9.37 868 | 56 | 0.62 188 | 9.98 795 | 3 | 33 | 10 9.0 8.8 8.7 |
| 28 | 9.36 713 | 53 | 9.37 924 | 56 | 0.62 132 | 9.98 792 | 3 | 32 | 20 18.0 17.7 17.3 |
| 29 | 9.36 766 | 53 | 9.37 980 | 56 | 0.62 076 | 9.98 789 | 3 | 31 | 30 27.0 26.5 26.0 |
| 30 | 9.36 819 | 53 | 9.38 035 | 55 | 0.62 020 | 9.98 786 | 3 | 30 | 40 36.0 35.3 34.7 |
| 31 | 9.36 871 | 52 | 9.38 091 | 56 | 0.61 965 | 9.98 783 | 3 | 29 | 50 45.0 44.2 43.3 |
| 32 | 9.36 924 | 53 | 9.38 147 | 56 | 0.61 909 | 9.98 780 | 3 | 28 | " 51 4 3 2 |
| 33 | 9.36 976 | 52 | 9.38 202 | 55 | 0.61 853 | 9.98 777 | 3 | 27 | 1 0.8 0.1 0.0 0.0 |
| 34 | 9.37 028 | 53 | 9.38 257 | 55 | 0.61 798 | 9.98 774 | 3 | 26 | 2 1.7 0.1 0.1 0.1 |
| 35 | 9.37 081 | 52 | 9.38 313 | 56 | 0.61 743 | 9.98 771 | 3 | 25 | 3 2.6 0.2 0.2 0.1 |
| 36 | 9.37 133 | 52 | 9.38 368 | 55 | 0.61 687 | 9.98 768 | 3 | 24 | 4 3.4 0.3 0.2 0.1 |
| 37 | 9.37 185 | 52 | 9.38 423 | 55 | 0.61 632 | 9.98 765 | 3 | 23 | 5 4.2 0.3 0.2 0.2 |
| 38 | 9.37 237 | 52 | 9.38 479 | 56 | 0.61 577 | 9.98 762 | 3 | 22 | 6 5.1 0.4 0.3 0.2 |
| 39 | 9.37 289 | 52 | 9.38 534 | 55 | 0.61 521 | 9.98 759 | 3 | 21 | 7 6.0 0.5 0.4 0.2 |
| 40 | 9.37 341 | 52 | 9.38 589 | 55 | 0.61 466 | 9.98 756 | 3 | 20 | 8 6.8 0.6 0.4 0.3 |
| 41 | 9.37 393 | 52 | 9.38 644 | 55 | 0.61 411 | 9.98 753 | 3 | 19 | 9 7.6 0.6 0.4 0.3 |
| 42 | 9.37 445 | 52 | 9.38 699 | 55 | 0.61 356 | 9.98 750 | 3 | 18 | 10 8.5 0.7 0.5 0.3 |
| 43 | 9.37 497 | 52 | 9.38 754 | 55 | 0.61 301 | 9.98 746 | 3 | 17 | 20 17.0 1.3 1.0 0.7 |
| 44 | 9.37 549 | 51 | 9.38 808 | 55 | 0.61 246 | 9.98 743 | 3 | 16 | 30 25.5 2.0 1.5 1.0 |
| 45 | 9.37 600 | 52 | 9.38 863 | 55 | 0.61 192 | 9.98 740 | 3 | 15 | 40 34.0 2.7 2.0 1.3 |
| 46 | 9.37 652 | 51 | 9.38 918 | 55 | 0.61 137 | 9.98 737 | 3 | 14 | 50 42.5 3.3 2.5 1.7 |
| 47 | 9.37 703 | 51 | 9.38 972 | 54 | 0.61 082 | 9.98 734 | 3 | 13 | |
| 48 | 9.37 755 | 52 | 9.39 027 | 55 | 0.61 028 | 9.98 731 | 3 | 12 | |
| 49 | 9.37 806 | 51 | 9.39 082 | 55 | 0.60 973 | 9.98 728 | 3 | 11 | |
| 50 | 9.37 858 | 52 | 9.39 136 | 54 | 0.60 918 | 9.98 725 | 3 | 10 | |
| 51 | 9.37 909 | 51 | 9.39 190 | 54 | 0.60 864 | 9.98 722 | 3 | 9 | |
| 52 | 9.37 960 | 51 | 9.39 245 | 55 | 0.60 810 | 9.98 719 | 3 | 8 | |
| 53 | 9.38 011 | 51 | 9.39 299 | 54 | 0.60 755 | 9.98 716 | 4 | 7 | |
| 54 | 9.38 062 | 51 | 9.39 353 | 54 | 0.60 701 | 9.98 713 | 3 | 6 | |
| 55 | 9.38 113 | 51 | 9.39 407 | 54 | 0.60 647 | 9.98 709 | 3 | 5 | |
| 56 | 9.38 164 | 51 | 9.39 461 | 54 | 0.60 593 | 9.98 706 | 3 | 4 | |
| 57 | 9.38 215 | 51 | 9.39 515 | 54 | 0.60 539 | 9.98 703 | 3 | 3 | |
| 58 | 9.38 266 | 51 | 9.39 569 | 54 | 0.60 485 | 9.98 700 | 3 | 2 | |
| 59 | 9.38 317 | 51 | 9.39 623 | 54 | 0.60 431 | 9.98 697 | 3 | 1 | |
| 60 | 9.38 368 | 51 | 9.39 677 | 54 | 0.60 377 | 9.98 694 | 4 | 0 | |
| | | | | | 0.60 323 | 9.98 690 | | | |
| ' | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | ' | P. P. |

103° (283°)

(256°) 76°

LOGARITHMS OF THE FUNCTIONS (Continued)

14° (194°)

(345°) 165°

| ' | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | ' | P. P. | | | |
|----|----------|----|----------|------|----------|----------|----|----|-------|------|------|------|
| 0 | 9.38 368 | 50 | 9.39 677 | 54 | 0.60 323 | 9.98 690 | 3 | 60 | " | 54 | 53 | 52 |
| 1 | 9.38 418 | 51 | 9.39 731 | 54 | 0.60 269 | 9.98 687 | 3 | 59 | 1 | 0.9 | 0.9 | 0.9 |
| 2 | 9.38 469 | 51 | 9.39 785 | 53 | 0.60 215 | 9.98 684 | 3 | 58 | 2 | 1.8 | 1.8 | 1.7 |
| 3 | 9.38 519 | 51 | 9.39 838 | 54 | 0.60 162 | 9.98 681 | 3 | 57 | 3 | 2.7 | 2.6 | 2.6 |
| 4 | 9.38 570 | 50 | 9.39 892 | 53 | 0.60 108 | 9.98 678 | 3 | 56 | 4 | 3.6 | 3.5 | 3.5 |
| 5 | 9.38 620 | 50 | 9.39 945 | 54 | 0.60 055 | 9.98 675 | 4 | 55 | 5 | 4.5 | 4.4 | 4.3 |
| 6 | 9.38 670 | 51 | 9.39 999 | 53 | 0.60 001 | 9.98 671 | 3 | 54 | 6 | 5.4 | 5.3 | 5.2 |
| 7 | 9.38 721 | 50 | 9.40 052 | 54 | 0.59 948 | 9.98 668 | 3 | 53 | 7 | 6.3 | 6.2 | 6.1 |
| 8 | 9.38 771 | 50 | 9.40 106 | 53 | 0.59 894 | 9.98 665 | 3 | 52 | 8 | 7.2 | 7.1 | 6.9 |
| 9 | 9.38 821 | 50 | 9.40 159 | 53 | 0.59 841 | 9.98 662 | 3 | 51 | 9 | 8.1 | 8.0 | 7.8 |
| 10 | 9.38 871 | 50 | 9.40 212 | 54 | 0.59 788 | 9.98 659 | 3 | 50 | 10 | 9.0 | 8.8 | 8.7 |
| 11 | 9.38 921 | 50 | 9.40 266 | 53 | 0.59 734 | 9.98 656 | 4 | 49 | 20 | 18.0 | 17.7 | 17.3 |
| 12 | 9.38 971 | 50 | 9.40 319 | 53 | 0.59 681 | 9.98 652 | 3 | 48 | 30 | 27.0 | 26.5 | 26.0 |
| 13 | 9.39 021 | 50 | 9.40 372 | 53 | 0.59 628 | 9.98 649 | 3 | 47 | 40 | 36.0 | 35.3 | 34.7 |
| 14 | 9.39 071 | 50 | 9.40 425 | 53 | 0.59 575 | 9.98 646 | 3 | 46 | 50 | 45.0 | 44.2 | 43.3 |
| 15 | 9.39 121 | 49 | 9.40 478 | 53 | 0.59 522 | 9.98 643 | 3 | 45 | " | 51 | 50 | 49 |
| 16 | 9.39 170 | 49 | 9.40 531 | 53 | 0.59 469 | 9.98 640 | 4 | 44 | 1 | 0.8 | 0.8 | 0.8 |
| 17 | 9.39 220 | 50 | 9.40 584 | 52 | 0.59 416 | 9.98 636 | 4 | 43 | 2 | 1.7 | 1.7 | 1.6 |
| 18 | 9.39 270 | 49 | 9.40 636 | 53 | 0.59 364 | 9.98 633 | 3 | 42 | 3 | 2.6 | 2.5 | 2.4 |
| 19 | 9.39 319 | 50 | 9.40 689 | 53 | 0.59 311 | 9.98 630 | 3 | 41 | 4 | 3.4 | 3.3 | 3.3 |
| 20 | 9.39 369 | 49 | 9.40 742 | 53 | 0.59 258 | 9.98 627 | 4 | 40 | 5 | 4.2 | 4.2 | 4.1 |
| 21 | 9.39 418 | 49 | 9.40 795 | 52 | 0.59 205 | 9.98 623 | 3 | 39 | 6 | 5.1 | 5.0 | 4.9 |
| 22 | 9.39 467 | 50 | 9.40 847 | 52 | 0.59 153 | 9.98 620 | 3 | 38 | 7 | 6.0 | 5.8 | 5.7 |
| 23 | 9.39 517 | 49 | 9.40 900 | 53 | 0.59 100 | 9.98 617 | 3 | 37 | 8 | 6.8 | 6.7 | 6.5 |
| 24 | 9.39 566 | 49 | 9.40 952 | 53 | 0.59 048 | 9.98 614 | 4 | 36 | 9 | 7.6 | 7.5 | 7.4 |
| 25 | 9.39 615 | 49 | 9.41 005 | 52 | 0.58 995 | 9.98 610 | 3 | 35 | 10 | 8.5 | 8.3 | 8.2 |
| 26 | 9.39 664 | 49 | 9.41 057 | 52 | 0.58 943 | 9.98 607 | 3 | 34 | 20 | 17.0 | 16.7 | 16.3 |
| 27 | 9.39 713 | 49 | 9.41 109 | 52 | 0.58 891 | 9.98 604 | 3 | 33 | 30 | 25.5 | 25.0 | 24.5 |
| 28 | 9.39 762 | 49 | 9.41 161 | 53 | 0.58 839 | 9.98 601 | 3 | 32 | 40 | 34.0 | 33.3 | 32.7 |
| 29 | 9.39 811 | 49 | 9.41 214 | 52 | 0.58 786 | 9.98 597 | 4 | 31 | 50 | 42.5 | 41.7 | 40.8 |
| 30 | 9.39 860 | 49 | 9.41 266 | 52 | 0.58 734 | 9.98 594 | 3 | 30 | " | 48 | 47 | 4 |
| 31 | 9.39 909 | 49 | 9.41 318 | 52 | 0.58 682 | 9.98 591 | 3 | 29 | 1 | 0.8 | 0.8 | 0.1 |
| 32 | 9.39 958 | 49 | 9.41 370 | 52 | 0.58 630 | 9.98 588 | 4 | 28 | 2 | 1.6 | 1.6 | 0.1 |
| 33 | 9.40 006 | 48 | 9.41 422 | 52 | 0.58 578 | 9.98 584 | 4 | 27 | 3 | 2.4 | 2.4 | 0.2 |
| 34 | 9.40 055 | 48 | 9.41 474 | 52 | 0.58 526 | 9.98 581 | 3 | 26 | 4 | 3.2 | 3.1 | 0.3 |
| 35 | 9.40 103 | 49 | 9.41 526 | 52 | 0.58 474 | 9.98 578 | 4 | 25 | 5 | 4.0 | 3.9 | 0.3 |
| 36 | 9.40 152 | 48 | 9.41 578 | 51 | 0.58 422 | 9.98 574 | 4 | 24 | 6 | 4.8 | 4.7 | 0.4 |
| 37 | 9.40 200 | 49 | 9.41 629 | 52 | 0.58 371 | 9.98 571 | 3 | 23 | 7 | 5.6 | 5.5 | 0.5 |
| 38 | 9.40 249 | 49 | 9.41 681 | 52 | 0.58 319 | 9.98 568 | 3 | 22 | 8 | 6.4 | 6.3 | 0.5 |
| 39 | 9.40 297 | 48 | 9.41 733 | 51 | 0.58 267 | 9.98 565 | 4 | 21 | 9 | 7.2 | 7.0 | 0.6 |
| 40 | 9.40 346 | 48 | 9.41 784 | 52 | 0.58 216 | 9.98 561 | 3 | 20 | 10 | 8.0 | 7.8 | 0.7 |
| 41 | 9.40 394 | 48 | 9.41 836 | 51 | 0.58 164 | 9.98 558 | 3 | 19 | 20 | 16.0 | 15.7 | 1.3 |
| 42 | 9.40 442 | 48 | 9.41 887 | 52 | 0.58 113 | 9.98 555 | 4 | 18 | 30 | 24.0 | 23.5 | 2.0 |
| 43 | 9.40 490 | 48 | 9.41 939 | 51 | 0.58 061 | 9.98 551 | 4 | 17 | 40 | 32.0 | 31.3 | 2.7 |
| 44 | 9.40 538 | 48 | 9.41 990 | 51 | 0.58 010 | 9.98 548 | 3 | 16 | 50 | 40.0 | 39.2 | 3.3 |
| 45 | 9.40 586 | 48 | 9.42 041 | 52 | 0.57 959 | 9.98 545 | 4 | 15 | | | | |
| 46 | 9.40 634 | 48 | 9.42 093 | 51 | 0.57 907 | 9.98 541 | 3 | 14 | | | | |
| 47 | 9.40 682 | 48 | 9.42 144 | 51 | 0.57 856 | 9.98 538 | 3 | 13 | | | | |
| 48 | 9.40 730 | 48 | 9.42 195 | 51 | 0.57 805 | 9.98 535 | 3 | 12 | | | | |
| 49 | 9.40 778 | 47 | 9.42 246 | 51 | 0.57 754 | 9.98 531 | 3 | 11 | | | | |
| 50 | 9.40 825 | 48 | 9.42 297 | 51 | 0.57 703 | 9.98 528 | 3 | 10 | 0 | 6.8 | 6.6 | 6.5 |
| 51 | 9.40 873 | 48 | 9.42 348 | 51 | 0.57 652 | 9.98 525 | 4 | 9 | 1 | 20.2 | 19.9 | 19.5 |
| 52 | 9.40 921 | 47 | 9.42 399 | 51 | 0.57 601 | 9.98 521 | 4 | 8 | 2 | 33.8 | 33.1 | 32.5 |
| 53 | 9.40 968 | 48 | 9.42 450 | 51 | 0.57 550 | 9.98 518 | 3 | 7 | 3 | 47.2 | 46.4 | 45.5 |
| 54 | 9.41 016 | 47 | 9.42 501 | 51 | 0.57 499 | 9.98 515 | 4 | 6 | 4 | | | |
| 55 | 9.41 063 | 48 | 9.42 552 | 51 | 0.57 448 | 9.98 511 | 3 | 5 | | | | |
| 56 | 9.41 111 | 47 | 9.42 603 | 50 | 0.57 397 | 9.98 508 | 4 | 4 | 0 | | | |
| 57 | 9.41 158 | 47 | 9.42 653 | 51 | 0.57 347 | 9.98 505 | 4 | 3 | 1 | 9.0 | 8.8 | 8.7 |
| 58 | 9.41 206 | 47 | 9.42 704 | 51 | 0.57 296 | 9.98 501 | 4 | 2 | 2 | 27.0 | 26.5 | 26.0 |
| 59 | 9.41 252 | 48 | 9.42 755 | 50 | 0.57 245 | 9.98 498 | 4 | 1 | 3 | 45.0 | 44.2 | 43.3 |
| 60 | 9.41 300 | | 9.42 805 | | 0.57 195 | 9.98 494 | 0 | | | | | |
| ' | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | ' | P. P. | | | |

104° (284°)

(255°) 75°

LOGARITHMS OF THE FUNCTIONS (Continued)

15° (195°)

(344°) 164°

| | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | | P. P. |
|----|----------|----|----------|------|----------|----------|----|----|---------------------|
| 0 | 9.41 300 | | 9.42 805 | | 0.57 195 | 9.98 494 | 60 | " | 51 50 49 |
| 1 | 9.41 347 | 47 | 9.42 856 | 51 | 0.57 144 | 9.98 491 | 59 | 1 | 0.8 0.8 0.8 |
| 2 | 9.41 394 | 47 | 9.42 906 | 50 | 0.57 094 | 9.98 488 | 58 | 2 | 1.7 1.7 1.6 |
| 3 | 9.41 441 | 47 | 9.42 957 | 51 | 0.57 043 | 9.98 484 | 57 | 3 | 2.6 2.5 2.4 |
| 4 | 9.41 488 | 47 | 9.43 007 | 50 | 0.56 993 | 9.98 481 | 56 | 4 | 3.4 3.3 3.3 |
| 5 | 9.41 535 | 47 | 9.43 057 | | 0.56 943 | 9.98 477 | 55 | 5 | 4.2 4.2 4.1 |
| 6 | 9.41 582 | 47 | 9.43 108 | 51 | 0.56 892 | 9.98 474 | 54 | 6 | 5.1 5.0 4.9 |
| 7 | 9.41 628 | 46 | 9.43 158 | 50 | 0.56 842 | 9.98 471 | 53 | 7 | 6.0 5.8 5.7 |
| 8 | 9.41 675 | 47 | 9.43 208 | 50 | 0.56 792 | 9.98 467 | 52 | 8 | 6.8 6.7 6.5 |
| 9 | 9.41 722 | 47 | 9.43 258 | 50 | 0.56 742 | 9.98 464 | 51 | 9 | 7.6 7.5 7.4 |
| 10 | 9.41 768 | 46 | 9.43 308 | 50 | 0.56 692 | 9.98 460 | 50 | 10 | 8.5 8.3 8.2 |
| 11 | 9.41 815 | 47 | 9.43 358 | 50 | 0.56 642 | 9.98 457 | 49 | 20 | 17.0 16.7 16.3 |
| 12 | 9.41 861 | 46 | 9.43 408 | 50 | 0.56 592 | 9.98 453 | 48 | 30 | 25.5 25.0 24.5 |
| 13 | 9.41 908 | 47 | 9.43 458 | 50 | 0.56 542 | 9.98 450 | 47 | 40 | 34.0 33.3 32.7 |
| 14 | 9.41 954 | 46 | 9.43 508 | 50 | 0.56 492 | 9.98 447 | 46 | 50 | 42.5 41.7 40.8 |
| 15 | 9.42 001 | 47 | 9.43 558 | 50 | 0.56 442 | 9.98 443 | 45 | " | 48 47 46 |
| 16 | 9.42 047 | 46 | 9.43 607 | 49 | 0.56 393 | 9.98 440 | 44 | 1 | 0.8 0.8 0.8 |
| 17 | 9.42 093 | 47 | 9.43 657 | 50 | 0.56 343 | 9.98 436 | 43 | 2 | 1.6 1.6 1.5 |
| 18 | 9.42 140 | 46 | 9.43 707 | 50 | 0.56 293 | 9.98 433 | 42 | 3 | 2.4 2.4 2.3 |
| 19 | 9.42 186 | 46 | 9.43 756 | 49 | 0.56 244 | 9.98 429 | 41 | 4 | 3.2 3.1 3.1 |
| 20 | 9.42 232 | 46 | 9.43 806 | 50 | 0.56 194 | 9.98 426 | 40 | 5 | 4.0 3.9 3.8 |
| 21 | 9.42 278 | 46 | 9.43 855 | 49 | 0.56 145 | 9.98 422 | 39 | 6 | 4.8 4.7 4.6 |
| 22 | 9.42 324 | 46 | 9.43 905 | 50 | 0.56 095 | 9.98 419 | 38 | 7 | 5.6 5.5 5.4 |
| 23 | 9.42 370 | 46 | 9.43 954 | 49 | 0.56 046 | 9.98 415 | 37 | 8 | 6.4 6.3 6.1 |
| 24 | 9.42 416 | 45 | 9.44 004 | 50 | 0.55 996 | 9.98 412 | 36 | 9 | 7.2 7.0 6.9 |
| 25 | 9.42 461 | 46 | 9.44 053 | 49 | 0.55 947 | 9.98 409 | 35 | 10 | 8.0 7.8 7.7 |
| 26 | 9.42 507 | 46 | 9.44 102 | 49 | 0.55 898 | 9.98 405 | 34 | 20 | 16.0 15.7 15.3 |
| 27 | 9.42 553 | 46 | 9.44 151 | 50 | 0.55 849 | 9.98 402 | 33 | 30 | 24.0 23.5 23.0 |
| 28 | 9.42 599 | 46 | 9.44 201 | 50 | 0.55 799 | 9.98 398 | 32 | 40 | 32.0 31.3 30.7 |
| 29 | 9.42 644 | 45 | 9.44 250 | 49 | 0.55 750 | 9.98 395 | 31 | 50 | 40.0 39.2 38.3 |
| 30 | 9.42 690 | 45 | 9.44 299 | 49 | 0.55 701 | 9.98 391 | 30 | " | 45 44 4 3 |
| 31 | 9.42 735 | 45 | 9.44 348 | 49 | 0.55 652 | 9.98 388 | 29 | 1 | 0.8 0.7 0.1 0.0 |
| 32 | 9.42 781 | 46 | 9.44 397 | 49 | 0.55 603 | 9.98 384 | 28 | 2 | 1.5 1.5 0.1 0.1 |
| 33 | 9.42 826 | 46 | 9.44 446 | 49 | 0.55 554 | 9.98 381 | 27 | 3 | 2.2 2.2 0.2 0.2 |
| 34 | 9.42 872 | 45 | 9.44 495 | 49 | 0.55 505 | 9.98 377 | 26 | 4 | 3.0 2.9 0.3 0.2 |
| 35 | 9.42 917 | 45 | 9.44 544 | 48 | 0.55 456 | 9.98 373 | 25 | 5 | 3.8 3.7 0.3 0.2 |
| 36 | 9.42 962 | 45 | 9.44 592 | 48 | 0.55 408 | 9.98 370 | 24 | 6 | 4.5 4.4 0.4 0.3 |
| 37 | 9.43 008 | 46 | 9.44 641 | 49 | 0.55 359 | 9.98 366 | 23 | 7 | 5.2 5.1 0.5 0.4 |
| 38 | 9.43 053 | 45 | 9.44 690 | 49 | 0.55 310 | 9.98 363 | 22 | 8 | 6.0 5.9 0.5 0.4 |
| 39 | 9.43 098 | 45 | 9.44 738 | 48 | 0.55 262 | 9.98 359 | 21 | 9 | 6.8 6.6 0.6 0.4 |
| 40 | 9.43 143 | 45 | 9.44 787 | 49 | 0.55 213 | 9.98 356 | 20 | 10 | 7.5 7.3 0.7 0.5 |
| 41 | 9.43 188 | 45 | 9.44 836 | 49 | 0.55 164 | 9.98 352 | 19 | 20 | 15.0 14.7 1.3 1.0 |
| 42 | 9.43 233 | 45 | 9.44 884 | 48 | 0.55 116 | 9.98 349 | 18 | 30 | 22.5 22.0 2.0 1.5 |
| 43 | 9.43 278 | 45 | 9.44 933 | 49 | 0.55 067 | 9.98 345 | 17 | 40 | 30.0 29.3 2.7 2.0 |
| 44 | 9.43 323 | 44 | 9.44 981 | 48 | 0.55 019 | 9.98 342 | 16 | 50 | 37.5 36.7 3.3 2.5 |
| 45 | 9.43 367 | 45 | 9.45 029 | 49 | 0.54 971 | 9.98 338 | 15 | | |
| 46 | 9.43 412 | 45 | 9.45 078 | 48 | 0.54 922 | 9.98 334 | 14 | | |
| 47 | 9.43 457 | 45 | 9.45 126 | 48 | 0.54 874 | 9.98 331 | 13 | | |
| 48 | 9.43 502 | 45 | 9.45 174 | 48 | 0.54 826 | 9.98 327 | 12 | | |
| 49 | 9.43 546 | 44 | 9.45 222 | 49 | 0.54 778 | 9.98 324 | 11 | | |
| 50 | 9.43 591 | 44 | 9.45 271 | 48 | 0.54 729 | 9.98 320 | 10 | 0 | 6.2 6.1 6.0 5.9 |
| 51 | 9.43 635 | 44 | 9.45 319 | 48 | 0.54 681 | 9.98 317 | 9 | 1 | 18.8 18.4 18.0 17.6 |
| 52 | 9.43 680 | 45 | 9.45 367 | 48 | 0.54 633 | 9.98 313 | 8 | 2 | 31.2 30.6 30.0 29.4 |
| 53 | 9.43 724 | 44 | 9.45 415 | 48 | 0.54 585 | 9.98 309 | 7 | 3 | 43.8 42.9 42.0 41.1 |
| 54 | 9.43 769 | 45 | 9.45 463 | 48 | 0.54 537 | 9.98 306 | 6 | 4 | |
| 55 | 9.43 813 | 44 | 9.45 511 | 48 | 0.54 489 | 9.98 302 | 5 | | |
| 56 | 9.43 857 | 44 | 9.45 559 | 47 | 0.54 441 | 9.98 299 | 4 | | |
| 57 | 9.43 901 | 44 | 9.45 606 | 48 | 0.54 394 | 9.98 295 | 3 | 0 | 8.5 8.3 8.2 8.0 |
| 58 | 9.43 946 | 45 | 9.45 654 | 48 | 0.54 346 | 9.98 291 | 2 | 1 | 25.5 25.0 24.5 24.0 |
| 59 | 9.43 990 | 44 | 9.45 702 | 48 | 0.54 298 | 9.98 288 | 1 | 2 | 42.5 41.7 40.8 40.0 |
| 60 | 9.44 034 | | 9.45 750 | | 0.54 250 | 9.98 284 | 0 | 3 | |
| | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | | P. P. |

105° (285°)

(254°) 74°

LOGARITHMS OF THE FUNCTIONS (Continued)

16° (196°)

(343°) 163°

| | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | | P.P. |
|----|----------|----|----------|------|----------|----------|----|----|------------------------|
| 0 | 9.44 034 | | 9.45 750 | | 0.54 250 | 9.98 284 | | 60 | " |
| 1 | 9.44 078 | 44 | 9.45 797 | 47 | 0.54 203 | 9.98 281 | 3 | 59 | 48 47 46 |
| 2 | 9.44 122 | 44 | 9.45 845 | 48 | 0.54 155 | 9.98 277 | 4 | 58 | 1 0.8 0.8 0.8 |
| 3 | 9.44 166 | 44 | 9.45 892 | 47 | 0.54 108 | 9.98 273 | 4 | 57 | 2 1.6 1.6 1.5 |
| 4 | 9.44 210 | 44 | 9.45 940 | 48 | 0.54 060 | 9.98 270 | 3 | 56 | 3 2.4 2.4 2.3 |
| | | 43 | | 47 | | | 4 | 55 | 4 3.2 3.1 3.1 |
| 5 | 9.44 253 | | 9.45 987 | | 0.54 013 | 9.98 266 | | 55 | 5 4.0 3.9 3.8 |
| 6 | 9.44 297 | 44 | 9.46 035 | 48 | 0.53 965 | 9.98 262 | 4 | 54 | 6 4.8 4.7 4.6 |
| 7 | 9.44 341 | 44 | 9.46 082 | 47 | 0.53 918 | 9.98 259 | 3 | 53 | 7 5.6 5.5 5.4 |
| 8 | 9.44 385 | 44 | 9.46 130 | 48 | 0.53 870 | 9.98 255 | 4 | 52 | 8 6.4 6.3 6.1 |
| 9 | 9.44 428 | 43 | 9.46 177 | 47 | 0.53 823 | 9.98 251 | 4 | 51 | 9 7.2 7.0 6.9 |
| | | 44 | | 47 | | | 3 | 50 | 10 8.0 7.8 7.7 |
| 10 | 9.44 472 | | 9.46 224 | | 0.53 776 | 9.98 248 | | 49 | 20 16.0 15.7 15.3 |
| 11 | 9.44 516 | 44 | 9.46 271 | 47 | 0.53 729 | 9.98 244 | 4 | 48 | 30 24.0 23.5 23.0 |
| 12 | 9.44 559 | 43 | 9.46 319 | 48 | 0.53 681 | 9.98 240 | 4 | 47 | 40 32.0 31.3 30.7 |
| 13 | 9.44 602 | 43 | 9.46 366 | 47 | 0.53 634 | 9.98 237 | 3 | 46 | 50 40.0 39.2 38.3 |
| 14 | 9.44 646 | 44 | 9.46 413 | 47 | 0.53 587 | 9.98 233 | 4 | 45 | " 45 44 43 |
| | | 43 | | 47 | | | 3 | 44 | 1 0.8 0.7 0.7 |
| 15 | 9.44 689 | | 9.46 460 | | 0.53 540 | 9.98 229 | | 43 | 2 1.5 1.5 1.4 |
| 16 | 9.44 733 | 44 | 9.46 507 | 47 | 0.53 493 | 9.98 226 | 4 | 42 | 3 2.2 2.2 2.2 |
| 17 | 9.44 776 | 43 | 9.46 554 | 47 | 0.53 446 | 9.98 222 | 4 | 41 | 4 3.0 2.9 2.9 |
| 18 | 9.44 819 | 43 | 9.46 601 | 47 | 0.53 399 | 9.98 218 | 3 | 40 | 5 3.8 3.7 3.6 |
| 19 | 9.44 862 | 43 | 9.46 648 | 46 | 0.53 352 | 9.98 215 | 4 | 39 | 6 4.5 4.4 4.3 |
| | | 43 | | 46 | | | 3 | 38 | 7 5.2 5.1 5.0 |
| 20 | 9.44 905 | | 9.46 694 | | 0.53 306 | 9.98 211 | | 37 | 8 6.0 5.9 5.7 |
| 21 | 9.44 948 | 43 | 9.46 741 | 47 | 0.53 259 | 9.98 207 | 4 | 36 | 9 6.8 6.6 6.4 |
| 22 | 9.44 992 | 44 | 9.46 788 | 47 | 0.53 212 | 9.98 204 | 4 | 35 | 10 7.5 7.3 7.2 |
| 23 | 9.45 035 | 43 | 9.46 835 | 47 | 0.53 165 | 9.98 200 | 4 | 34 | 20 15.0 14.7 14.3 |
| 24 | 9.45 077 | 42 | 9.46 881 | 46 | 0.53 119 | 9.98 196 | 4 | 33 | 30 22.5 22.0 21.5 |
| | | 43 | | 46 | | | 3 | 32 | 40 30.0 29.3 28.7 |
| 25 | 9.45 120 | | 9.46 928 | | 0.53 072 | 9.98 192 | | 31 | 50 37.5 36.7 35.8 |
| 26 | 9.45 163 | 43 | 9.46 975 | 47 | 0.53 025 | 9.98 189 | 4 | 30 | " 42 41 4 3 |
| 27 | 9.45 206 | 43 | 9.47 021 | 46 | 0.52 979 | 9.98 185 | 4 | 29 | 1 0.7 0.7 0.1 0.0 |
| 28 | 9.45 249 | 43 | 9.47 068 | 47 | 0.52 932 | 9.98 181 | 4 | 28 | 2 1.4 1.4 0.1 0.1 |
| 29 | 9.45 292 | 43 | 9.47 114 | 46 | 0.52 886 | 9.98 177 | 3 | 27 | 3 2.1 2.0 0.2 0.2 |
| | | 42 | | 46 | | | 4 | 26 | 4 2.8 2.7 0.3 0.2 |
| 30 | 9.45 334 | | 9.47 160 | | 0.52 840 | 9.98 174 | | 25 | 5 3.5 3.4 0.3 0.2 |
| 31 | 9.45 377 | 43 | 9.47 207 | 47 | 0.52 793 | 9.98 170 | 4 | 24 | 6 4.2 4.1 0.4 0.3 |
| 32 | 9.45 419 | 42 | 9.47 253 | 46 | 0.52 747 | 9.98 166 | 4 | 23 | 7 4.9 4.8 0.5 0.4 |
| 33 | 9.45 462 | 43 | 9.47 299 | 46 | 0.52 701 | 9.98 162 | 4 | 22 | 8 5.6 5.5 0.5 0.4 |
| 34 | 9.45 504 | 43 | 9.47 346 | 46 | 0.52 654 | 9.98 159 | 4 | 21 | 9 6.3 6.2 0.6 0.4 |
| | | 43 | | 46 | | | 4 | 20 | 10 7.0 6.8 0.7 0.5 |
| 35 | 9.45 547 | | 9.47 392 | | 0.52 608 | 9.98 155 | | 19 | 20 14.0 13.7 1.3 1.0 |
| 36 | 9.45 589 | 42 | 9.47 438 | 46 | 0.52 562 | 9.98 151 | 4 | 18 | 30 21.0 20.5 2.0 1.5 |
| 37 | 9.45 632 | 43 | 9.47 484 | 46 | 0.52 516 | 9.98 147 | 4 | 17 | 40 28.0 27.3 2.7 2.0 |
| 38 | 9.45 674 | 42 | 9.47 530 | 46 | 0.52 470 | 9.98 144 | 4 | 16 | 50 35.0 34.2 3.3 2.5 |
| 39 | 9.45 716 | 42 | 9.47 576 | 46 | 0.52 424 | 9.98 140 | 4 | 15 | " 4 4 4 4 |
| | | 42 | | 46 | | | 4 | 14 | 0 48 47 46 45 |
| 40 | 9.45 758 | | 9.47 622 | | 0.52 378 | 9.98 136 | | 13 | 1 6.0 5.9 5.8 5.6 |
| 41 | 9.45 801 | 43 | 9.47 668 | 46 | 0.52 332 | 9.98 132 | 4 | 12 | 10 18.0 17.6 17.2 16.9 |
| 42 | 9.45 843 | 42 | 9.47 714 | 46 | 0.52 286 | 9.98 129 | 4 | 11 | 20 30.0 29.4 28.8 28.1 |
| 43 | 9.45 885 | 42 | 9.47 760 | 46 | 0.52 240 | 9.98 125 | 4 | 10 | 30 42.0 41.1 40.2 39.4 |
| 44 | 9.45 927 | 42 | 9.47 806 | 46 | 0.52 194 | 9.98 121 | 4 | 9 | " 3 3 3 3 |
| | | 42 | | 46 | | | 4 | 8 | 48 47 46 45 |
| 45 | 9.45 969 | | 9.47 852 | | 0.52 148 | 9.98 117 | | 7 | 1 8.0 7.8 7.7 7.5 |
| 46 | 9.46 011 | 42 | 9.47 897 | 45 | 0.52 103 | 9.98 113 | 4 | 6 | 2 24.0 23.5 23.0 22.5 |
| 47 | 9.46 053 | 42 | 9.47 943 | 46 | 0.52 057 | 9.98 110 | 4 | 5 | 3 40.0 39.2 38.3 37.5 |
| 48 | 9.46 095 | 42 | 9.47 989 | 46 | 0.52 011 | 9.98 106 | 4 | 4 | " 0 |
| 49 | 9.46 136 | 41 | 9.48 035 | 45 | 0.51 965 | 9.98 102 | 4 | 3 | |
| | | 42 | | 45 | | | 4 | 2 | |
| 50 | 9.46 178 | | 9.48 080 | | 0.51 920 | 9.98 098 | | 1 | |
| 51 | 9.46 220 | 42 | 9.48 126 | 46 | 0.51 874 | 9.98 094 | 4 | 0 | |
| 52 | 9.46 262 | 42 | 9.48 171 | 45 | 0.51 829 | 9.98 090 | 4 | | |
| 53 | 9.46 303 | 41 | 9.48 217 | 46 | 0.51 783 | 9.98 087 | 3 | | |
| 54 | 9.46 345 | 42 | 9.48 262 | 45 | 0.51 738 | 9.98 083 | 4 | | |
| | | 41 | | 45 | | | 4 | | |
| 55 | 9.46 386 | | 9.48 307 | | 0.51 693 | 9.98 079 | | | |
| 56 | 9.46 428 | 42 | 9.48 353 | 46 | 0.51 647 | 9.98 075 | 4 | | |
| 57 | 9.46 469 | 41 | 9.48 398 | 45 | 0.51 602 | 9.98 071 | 4 | | |
| 58 | 9.46 511 | 42 | 9.48 443 | 45 | 0.51 557 | 9.98 067 | 4 | | |
| 59 | 9.46 552 | 41 | 9.48 489 | 46 | 0.51 511 | 9.98 063 | 4 | | |
| | | 42 | | 45 | | | 3 | | |
| 60 | 9.46 594 | | 9.48 534 | | 0.51 466 | 9.98 060 | | | |
| | | | | | | | | | |
| | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | | P.P. |

106° (286°)

(253°) 73°

LOGARITHMS OF THE FUNCTIONS (Continued)

17° (197°)

(342°) 162°

| | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | | P.P. |
|----|----------|----|----------|------|----------|----------|----|----|---------------------|
| 0 | 9.46 594 | | 9.48 534 | | 0.51 466 | 9.98 060 | | 60 | " 45 44 43 |
| 1 | 9.46 635 | 41 | 9.48 579 | 45 | 0.51 421 | 9.98 056 | 4 | 59 | 1 0.8 0.7 0.7 |
| 2 | 9.46 676 | 41 | 9.48 624 | 45 | 0.51 376 | 9.98 052 | 4 | 58 | 2 1.5 1.5 1.4 |
| 3 | 9.46 717 | 41 | 9.48 669 | 45 | 0.51 331 | 9.98 048 | 4 | 57 | 3 2.2 2.2 2.2 |
| 4 | 9.46 758 | 42 | 9.48 714 | 45 | 0.51 286 | 9.98 044 | 4 | 56 | 4 3.0 2.9 2.9 |
| 5 | 9.46 800 | | 9.48 759 | | 0.51 241 | 9.98 040 | | 55 | 5 3.8 3.7 3.6 |
| 6 | 9.46 841 | 41 | 9.48 804 | 45 | 0.51 196 | 9.98 036 | 4 | 54 | 6 4.5 4.4 4.3 |
| 7 | 9.46 882 | 41 | 9.48 849 | 45 | 0.51 151 | 9.98 032 | 4 | 53 | 7 5.2 5.1 5.0 |
| 8 | 9.46 923 | 41 | 9.48 894 | 45 | 0.51 106 | 9.98 029 | 4 | 52 | 8 6.0 5.9 5.7 |
| 9 | 9.46 964 | 41 | 9.48 939 | 45 | 0.51 061 | 9.98 025 | 4 | 51 | 9 6.8 6.6 6.4 |
| 10 | 9.47 005 | | 9.48 984 | | 0.51 016 | 9.98 021 | | 50 | 10 7.5 7.3 7.2 |
| 11 | 9.47 045 | 40 | 9.49 029 | 45 | 0.50 971 | 9.98 017 | 4 | 49 | 20 15.0 14.7 14.3 |
| 12 | 9.47 086 | 41 | 9.49 073 | 44 | 0.50 927 | 9.98 013 | 4 | 48 | 30 22.5 22.0 21.5 |
| 13 | 9.47 127 | 41 | 9.49 118 | 45 | 0.50 882 | 9.98 009 | 4 | 47 | 40 30.0 29.3 28.7 |
| 14 | 9.47 168 | 41 | 9.49 163 | 45 | 0.50 837 | 9.98 005 | 4 | 46 | 50 37.5 36.7 35.8 |
| 15 | 9.47 209 | | 9.49 207 | | 0.50 793 | 9.98 001 | | 45 | " 42 41 40 |
| 16 | 9.47 249 | 40 | 9.49 252 | 45 | 0.50 748 | 9.97 997 | 4 | 44 | 1 0.7 0.7 0.7 |
| 17 | 9.47 290 | 41 | 9.49 296 | 44 | 0.50 704 | 9.97 993 | 4 | 43 | 2 1.4 1.4 1.3 |
| 18 | 9.47 330 | 40 | 9.49 341 | 45 | 0.50 659 | 9.97 989 | 4 | 42 | 3 2.1 2.0 2.0 |
| 19 | 9.47 371 | 40 | 9.49 385 | 44 | 0.50 615 | 9.97 986 | 3 | 41 | 4 2.8 2.7 2.7 |
| 20 | 9.47 411 | | 9.49 430 | | 0.50 570 | 9.97 982 | | 40 | 5 3.5 3.4 3.3 |
| 21 | 9.47 452 | 41 | 9.49 474 | 44 | 0.50 526 | 9.97 978 | 4 | 39 | 6 4.2 4.1 4.0 |
| 22 | 9.47 492 | 40 | 9.49 519 | 45 | 0.50 481 | 9.97 974 | 4 | 38 | 7 4.9 4.8 4.7 |
| 23 | 9.47 533 | 41 | 9.49 563 | 44 | 0.50 437 | 9.97 970 | 4 | 37 | 8 5.6 5.5 5.3 |
| 24 | 9.47 573 | 40 | 9.49 607 | 44 | 0.50 393 | 9.97 966 | 4 | 36 | 9 6.3 6.2 6.0 |
| 25 | 9.47 613 | | 9.49 652 | | 0.50 348 | 9.97 962 | | 35 | 10 7.0 6.8 6.7 |
| 26 | 9.47 654 | 41 | 9.49 696 | 44 | 0.50 304 | 9.97 958 | 4 | 34 | 20 14.0 13.7 13.3 |
| 27 | 9.47 694 | 40 | 9.49 740 | 44 | 0.50 260 | 9.97 954 | 4 | 33 | 30 21.0 20.5 20.0 |
| 28 | 9.47 734 | 40 | 9.49 784 | 44 | 0.50 216 | 9.97 950 | 4 | 32 | 40 28.0 27.3 26.7 |
| 29 | 9.47 774 | 40 | 9.49 828 | 44 | 0.50 172 | 9.97 946 | 4 | 31 | 50 35.0 34.2 33.3 |
| 30 | 9.47 814 | | 9.49 872 | | 0.50 128 | 9.97 942 | | 30 | " 39 5 4 3 |
| 31 | 9.47 854 | 40 | 9.49 916 | 44 | 0.50 084 | 9.97 938 | 4 | 29 | 1 0.6 0.1 0.1 0.0 |
| 32 | 9.47 894 | 40 | 9.49 960 | 44 | 0.50 040 | 9.97 934 | 4 | 28 | 2 1.3 0.2 0.1 0.1 |
| 33 | 9.47 934 | 40 | 9.50 004 | 44 | 0.49 996 | 9.97 930 | 4 | 27 | 3 2.0 0.2 0.2 0.2 |
| 34 | 9.47 974 | 40 | 9.50 048 | 44 | 0.49 952 | 9.97 926 | 4 | 26 | 4 2.6 0.3 0.3 0.2 |
| 35 | 9.48 014 | | 9.50 092 | | 0.49 908 | 9.97 922 | | 25 | 5 3.2 0.4 0.3 0.2 |
| 36 | 9.48 054 | 40 | 9.50 136 | 44 | 0.49 864 | 9.97 918 | 4 | 24 | 6 3.9 0.5 0.4 0.3 |
| 37 | 9.48 094 | 40 | 9.50 180 | 44 | 0.49 820 | 9.97 914 | 4 | 23 | 7 4.6 0.6 0.5 0.4 |
| 38 | 9.48 133 | 39 | 9.50 223 | 43 | 0.49 777 | 9.97 910 | 4 | 22 | 8 5.2 0.7 0.5 0.4 |
| 39 | 9.48 173 | 40 | 9.50 267 | 44 | 0.49 733 | 9.97 906 | 4 | 21 | 9 5.8 0.8 0.6 0.4 |
| 40 | 9.48 213 | | 9.50 311 | | 0.49 689 | 9.97 902 | | 20 | 10 6.5 0.8 0.7 0.5 |
| 41 | 9.48 252 | 39 | 9.50 355 | 44 | 0.49 645 | 9.97 898 | 4 | 19 | 20 13.0 1.7 1.3 1.0 |
| 42 | 9.48 292 | 40 | 9.50 398 | 43 | 0.49 602 | 9.97 894 | 4 | 18 | 30 19.5 2.5 2.0 1.5 |
| 43 | 9.48 332 | 40 | 9.50 442 | 43 | 0.49 558 | 9.97 890 | 4 | 17 | 40 26.0 3.3 2.7 2.0 |
| 44 | 9.48 371 | 39 | 9.50 485 | 43 | 0.49 515 | 9.97 886 | 4 | 16 | 50 32.5 4.2 3.3 2.5 |
| 45 | 9.48 411 | | 9.50 529 | | 0.49 471 | 9.97 882 | | 15 | |
| 46 | 9.48 450 | 39 | 9.50 572 | 43 | 0.49 428 | 9.97 878 | 4 | 14 | |
| 47 | 9.48 490 | 40 | 9.50 616 | 43 | 0.49 384 | 9.97 874 | 4 | 13 | 5 4 4 |
| 48 | 9.48 529 | 39 | 9.50 659 | 43 | 0.49 341 | 9.97 870 | 4 | 12 | 0 43 45 44 |
| 49 | 9.48 568 | 39 | 9.50 703 | 43 | 0.49 297 | 9.97 866 | 4 | 11 | 1 4.3 5.6 5.5 |
| 50 | 9.48 607 | | 9.50 746 | | 0.49 254 | 9.97 861 | | 10 | 2 12.9 16.9 16.5 |
| 51 | 9.48 647 | 40 | 9.50 789 | 43 | 0.49 211 | 9.97 857 | 4 | 9 | 3 21.5 28.1 27.5 |
| 52 | 9.48 686 | 39 | 9.50 833 | 44 | 0.49 167 | 9.97 853 | 4 | 8 | 4 30.1 39.4 38.5 |
| 53 | 9.48 725 | 39 | 9.50 876 | 43 | 0.49 124 | 9.97 849 | 4 | 7 | 5 38.7 — — |
| 54 | 9.48 764 | 39 | 9.50 919 | 43 | 0.49 081 | 9.97 845 | 4 | 6 | |
| 55 | 9.48 803 | | 9.50 962 | | 0.49 038 | 9.97 841 | | 5 | 4 3 3 |
| 56 | 9.48 842 | 39 | 9.51 005 | 43 | 0.48 995 | 9.97 837 | 4 | 4 | 0 43 45 44 |
| 57 | 9.48 881 | 39 | 9.51 048 | 43 | 0.48 952 | 9.97 833 | 4 | 3 | 1 5.4 7.5 7.3 |
| 58 | 9.48 920 | 39 | 9.51 092 | 44 | 0.48 908 | 9.97 829 | 4 | 2 | 2 16.1 22.5 22.0 |
| 59 | 9.48 959 | 39 | 9.51 135 | 43 | 0.48 865 | 9.97 825 | 4 | 1 | 3 26.9 37.5 36.7 |
| 60 | 9.48 998 | 39 | 9.51 178 | 43 | 0.48 822 | 9.97 821 | 4 | 0 | 4 37.6 — — |
| | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | | P.P. |

107° (287°)

(252°) 72°

LOGARITHMS OF THE FUNCTIONS (Continued)

18° (198°)

(341°) 161°

| ' | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d | ' | P. P. | | | |
|----|----------|----|----------|------|----------|----------|---|----|-------|------|------|------|
| 0 | 9.48 998 | | 9.51 178 | | 0.48 822 | 9.97 821 | | 60 | " | 43 | 42 | 41 |
| 1 | 9.49 037 | 39 | 9.51 221 | 43 | 0.48 779 | 9.97 817 | 4 | 59 | 1 | 0.7 | 0.7 | 0.7 |
| 2 | 9.49 076 | 39 | 9.51 264 | 43 | 0.48 736 | 9.97 812 | 5 | 58 | 2 | 1.4 | 1.4 | 1.4 |
| 3 | 9.49 115 | 39 | 9.51 306 | 42 | 0.48 694 | 9.97 808 | 4 | 57 | 3 | 2.2 | 2.1 | 2.0 |
| 4 | 9.49 153 | 38 | 9.51 349 | 43 | 0.48 651 | 9.97 804 | 4 | 56 | 4 | 2.9 | 2.8 | 2.7 |
| 5 | 9.49 192 | 39 | 9.51 392 | 43 | 0.48 608 | 9.97 800 | 4 | 55 | 5 | 3.6 | 3.5 | 3.4 |
| 6 | 9.49 231 | 39 | 9.51 435 | 43 | 0.48 565 | 9.97 796 | 4 | 54 | 6 | 4.3 | 4.2 | 4.1 |
| 7 | 9.49 269 | 38 | 9.51 478 | 43 | 0.48 522 | 9.97 792 | 4 | 53 | 7 | 5.0 | 4.9 | 4.8 |
| 8 | 9.49 308 | 39 | 9.51 520 | 42 | 0.48 480 | 9.97 788 | 4 | 52 | 8 | 5.7 | 5.6 | 5.5 |
| 9 | 9.49 347 | 39 | 9.51 563 | 43 | 0.48 437 | 9.97 784 | 4 | 51 | 9 | 6.4 | 6.3 | 6.2 |
| 10 | 9.49 385 | 38 | 9.51 606 | 43 | 0.48 394 | 9.97 779 | 5 | 50 | 10 | 7.2 | 7.0 | 6.8 |
| 11 | 9.49 424 | 39 | 9.51 648 | 42 | 0.48 352 | 9.97 775 | 4 | 49 | 20 | 14.3 | 14.0 | 13.7 |
| 12 | 9.49 462 | 38 | 9.51 691 | 43 | 0.48 309 | 9.97 771 | 4 | 48 | 30 | 21.5 | 21.0 | 20.5 |
| 13 | 9.49 500 | 38 | 9.51 734 | 43 | 0.48 266 | 9.97 767 | 4 | 47 | 40 | 28.7 | 28.0 | 27.3 |
| 14 | 9.49 539 | 39 | 9.51 776 | 42 | 0.48 224 | 9.97 763 | 4 | 46 | 50 | 35.8 | 35.0 | 34.2 |
| 15 | 9.49 577 | 38 | 9.51 819 | 43 | 0.48 181 | 9.97 759 | 4 | 45 | " | 39 | 38 | 37 |
| 16 | 9.49 615 | 38 | 9.51 861 | 42 | 0.48 139 | 9.97 754 | 5 | 44 | 1 | 0.6 | 0.6 | 0.6 |
| 17 | 9.49 654 | 39 | 9.51 903 | 42 | 0.48 097 | 9.97 750 | 4 | 43 | 2 | 1.3 | 1.3 | 1.2 |
| 18 | 9.49 692 | 38 | 9.51 946 | 43 | 0.48 054 | 9.97 746 | 4 | 42 | 3 | 2.0 | 1.9 | 1.8 |
| 19 | 9.49 730 | 38 | 9.51 988 | 42 | 0.48 012 | 9.97 742 | 4 | 41 | 4 | 2.6 | 2.5 | 2.5 |
| 20 | 9.49 768 | 38 | 9.52 031 | 43 | 0.47 969 | 9.97 738 | 4 | 40 | 5 | 3.2 | 3.2 | 3.1 |
| 21 | 9.49 806 | 38 | 9.52 073 | 42 | 0.47 927 | 9.97 734 | 4 | 39 | 6 | 3.9 | 3.8 | 3.7 |
| 22 | 9.49 844 | 38 | 9.52 115 | 42 | 0.47 885 | 9.97 729 | 5 | 38 | 7 | 4.6 | 4.4 | 4.3 |
| 23 | 9.49 882 | 38 | 9.52 157 | 43 | 0.47 843 | 9.97 725 | 4 | 37 | 8 | 5.2 | 5.1 | 4.9 |
| 24 | 9.49 920 | 38 | 9.52 200 | 42 | 0.47 800 | 9.97 721 | 4 | 36 | 9 | 5.8 | 5.7 | 5.6 |
| 25 | 9.49 958 | 38 | 9.52 242 | 42 | 0.47 758 | 9.97 717 | 4 | 35 | 10 | 6.5 | 6.3 | 6.2 |
| 26 | 9.49 996 | 38 | 9.52 284 | 42 | 0.47 716 | 9.97 713 | 4 | 34 | 20 | 13.0 | 12.7 | 12.3 |
| 27 | 9.50 034 | 38 | 9.52 326 | 42 | 0.47 674 | 9.97 708 | 5 | 33 | 30 | 19.5 | 19.0 | 18.5 |
| 28 | 9.50 072 | 38 | 9.52 368 | 42 | 0.47 632 | 9.97 704 | 4 | 32 | 40 | 26.0 | 25.3 | 24.7 |
| 29 | 9.50 110 | 38 | 9.52 410 | 42 | 0.47 590 | 9.97 700 | 4 | 31 | 50 | 32.5 | 31.7 | 30.8 |
| 30 | 9.50 148 | 37 | 9.52 452 | 42 | 0.47 548 | 9.97 696 | 4 | 30 | " | 36 | 5 | 4 |
| 31 | 9.50 185 | 37 | 9.52 494 | 42 | 0.47 506 | 9.97 691 | 5 | 29 | 1 | 0.6 | 0.1 | 0.1 |
| 32 | 9.50 223 | 38 | 9.52 536 | 42 | 0.47 464 | 9.97 687 | 4 | 28 | 2 | 1.2 | 0.2 | 0.1 |
| 33 | 9.50 261 | 38 | 9.52 578 | 42 | 0.47 422 | 9.97 683 | 4 | 27 | 3 | 1.8 | 0.2 | 0.2 |
| 34 | 9.50 298 | 37 | 9.52 620 | 42 | 0.47 380 | 9.97 679 | 4 | 26 | 4 | 2.4 | 0.3 | 0.3 |
| 35 | 9.50 336 | 38 | 9.52 661 | 41 | 0.47 339 | 9.97 674 | 5 | 25 | 5 | 3.0 | 0.4 | 0.3 |
| 36 | 9.50 374 | 38 | 9.52 703 | 42 | 0.47 297 | 9.97 670 | 4 | 24 | 6 | 3.6 | 0.5 | 0.4 |
| 37 | 9.50 411 | 37 | 9.52 745 | 42 | 0.47 255 | 9.97 666 | 4 | 23 | 7 | 4.2 | 0.6 | 0.5 |
| 38 | 9.50 449 | 38 | 9.52 787 | 42 | 0.47 213 | 9.97 662 | 4 | 22 | 8 | 4.8 | 0.7 | 0.6 |
| 39 | 9.50 486 | 37 | 9.52 829 | 41 | 0.47 171 | 9.97 657 | 5 | 21 | 9 | 5.4 | 0.8 | 0.6 |
| 40 | 9.50 523 | 38 | 9.52 870 | 42 | 0.47 130 | 9.97 653 | 4 | 20 | 10 | 6.0 | 0.8 | 0.7 |
| 41 | 9.50 561 | 37 | 9.52 912 | 42 | 0.47 088 | 9.97 649 | 4 | 19 | 20 | 12.0 | 1.7 | 1.3 |
| 42 | 9.50 598 | 37 | 9.52 953 | 41 | 0.47 047 | 9.97 645 | 4 | 18 | 30 | 18.0 | 2.5 | 2.0 |
| 43 | 9.50 635 | 37 | 9.52 995 | 42 | 0.47 005 | 9.97 640 | 5 | 17 | 40 | 24.0 | 3.3 | 2.7 |
| 44 | 9.50 673 | 38 | 9.53 037 | 42 | 0.46 963 | 9.97 636 | 4 | 16 | 50 | 30.0 | 4.2 | 3.2 |
| 45 | 9.50 710 | 37 | 9.53 078 | 41 | 0.46 922 | 9.97 632 | 4 | 15 | | | | |
| 46 | 9.50 747 | 37 | 9.53 120 | 42 | 0.46 880 | 9.97 628 | 4 | 14 | | 5 | 5 | 5 |
| 47 | 9.50 784 | 37 | 9.53 161 | 41 | 0.46 839 | 9.97 623 | 5 | 13 | | 43 | 42 | 41 |
| 48 | 9.50 821 | 37 | 9.53 202 | 41 | 0.46 798 | 9.97 619 | 4 | 12 | 0 | 4.3 | 4.2 | 4.1 |
| 49 | 9.50 858 | 38 | 9.53 244 | 42 | 0.46 756 | 9.97 615 | 4 | 11 | 1 | 12.9 | 12.6 | 12.3 |
| 50 | 9.50 896 | 37 | 9.53 285 | 41 | 0.46 715 | 9.97 610 | 5 | 10 | 2 | 21.5 | 21.0 | 20.5 |
| 51 | 9.50 933 | 37 | 9.53 327 | 42 | 0.46 673 | 9.97 606 | 4 | 9 | 3 | 30.1 | 29.4 | 28.7 |
| 52 | 9.50 970 | 37 | 9.53 368 | 41 | 0.46 632 | 9.97 602 | 4 | 8 | 4 | 38.7 | 37.8 | 36.9 |
| 53 | 9.51 007 | 37 | 9.53 409 | 41 | 0.46 591 | 9.97 597 | 5 | 7 | 5 | | | |
| 54 | 9.51 043 | 36 | 9.53 450 | 41 | 0.46 550 | 9.97 593 | 4 | 6 | | 4 | 4 | 4 |
| 55 | 9.51 080 | 37 | 9.53 492 | 42 | 0.46 508 | 9.97 589 | 4 | 5 | | 43 | 42 | 41 |
| 56 | 9.51 117 | 37 | 9.53 533 | 41 | 0.46 467 | 9.97 584 | 5 | 4 | 0 | 5.4 | 5.2 | 5.1 |
| 57 | 9.51 154 | 37 | 9.53 574 | 41 | 0.46 426 | 9.97 580 | 4 | 3 | 1 | 16.1 | 15.8 | 15.4 |
| 58 | 9.51 191 | 37 | 9.53 615 | 41 | 0.46 385 | 9.97 576 | 4 | 2 | 2 | 26.9 | 26.2 | 25.6 |
| 59 | 9.51 227 | 36 | 9.53 656 | 41 | 0.46 344 | 9.97 571 | 5 | 1 | 3 | 37.6 | 36.8 | 35.9 |
| 60 | 9.51 264 | 37 | 9.53 697 | 41 | 0.46 303 | 9.97 567 | 4 | 0 | 4 | | | |
| ' | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d | ' | P. P. | | | |

108° (288°)

(251°) 71°

LOGARITHMS OF THE FUNCTIONS (Continued)

19° (199°)

(340°) 160°

| ' | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | ' | P. P. | | | |
|----|----------|----|----------|------|----------|----------|----|----|-------|------|------|------|
| 0 | 9.51 264 | | 9.53 697 | | 0.46 303 | 9.97 567 | | 60 | " | 41 | 40 | 39 |
| 1 | 9.51 301 | 37 | 9.53 738 | 41 | 0.46 262 | 9.97 563 | 4 | 59 | 1 | 0.7 | 0.7 | 0.6 |
| 2 | 9.51 338 | 37 | 9.53 779 | 41 | 0.46 221 | 9.97 558 | 5 | 58 | 2 | 1.4 | 1.3 | 1.3 |
| 3 | 9.51 374 | 36 | 9.53 820 | 41 | 0.46 180 | 9.97 554 | 4 | 57 | 3 | 2.0 | 2.0 | 2.0 |
| 4 | 9.51 411 | 37 | 9.53 861 | 41 | 0.46 139 | 9.97 550 | 4 | 56 | 4 | 2.7 | 2.7 | 2.6 |
| 5 | 9.51 447 | 36 | 9.53 902 | 41 | 0.46 098 | 9.97 545 | 5 | 55 | 5 | 3.4 | 3.3 | 3.2 |
| 6 | 9.51 484 | 37 | 9.53 943 | 41 | 0.46 057 | 9.97 541 | 4 | 54 | 6 | 4.1 | 4.0 | 3.9 |
| 7 | 9.51 520 | 36 | 9.53 984 | 41 | 0.46 016 | 9.97 536 | 5 | 53 | 7 | 4.8 | 4.7 | 4.6 |
| 8 | 9.51 557 | 37 | 9.54 025 | 41 | 0.45 975 | 9.97 532 | 4 | 52 | 8 | 5.5 | 5.3 | 5.2 |
| 9 | 9.51 593 | 36 | 9.54 066 | 41 | 0.45 935 | 9.97 528 | 5 | 51 | 9 | 6.2 | 6.0 | 5.8 |
| 10 | 9.51 629 | 36 | 9.54 106 | 41 | 0.45 894 | 9.97 523 | 4 | 50 | 10 | 6.8 | 6.7 | 6.5 |
| 11 | 9.51 666 | 37 | 9.54 147 | 41 | 0.45 853 | 9.97 519 | 4 | 49 | 20 | 13.7 | 13.3 | 13.0 |
| 12 | 9.51 702 | 36 | 9.54 187 | 40 | 0.45 813 | 9.97 515 | 5 | 48 | 30 | 20.5 | 20.0 | 19.5 |
| 13 | 9.51 738 | 36 | 9.54 228 | 41 | 0.45 772 | 9.97 510 | 4 | 47 | 40 | 27.3 | 26.7 | 26.0 |
| 14 | 9.51 774 | 37 | 9.54 269 | 41 | 0.45 731 | 9.97 506 | 5 | 46 | 50 | 34.2 | 33.3 | 32.5 |
| 15 | 9.51 811 | 36 | 9.54 309 | 41 | 0.45 691 | 9.97 501 | 4 | 45 | " | 37 | 36 | 35 |
| 16 | 9.51 847 | 36 | 9.54 350 | 41 | 0.45 650 | 9.97 497 | 4 | 44 | 1 | 0.6 | 0.6 | 0.6 |
| 17 | 9.51 883 | 36 | 9.54 390 | 40 | 0.45 610 | 9.97 492 | 5 | 43 | 2 | 1.2 | 1.2 | 1.2 |
| 18 | 9.51 919 | 36 | 9.54 431 | 41 | 0.45 569 | 9.97 488 | 4 | 42 | 3 | 1.8 | 1.8 | 1.8 |
| 19 | 9.51 955 | 36 | 9.54 471 | 40 | 0.45 529 | 9.97 484 | 5 | 41 | 4 | 2.5 | 2.4 | 2.3 |
| 20 | 9.51 991 | 36 | 9.54 512 | 41 | 0.45 488 | 9.97 479 | 4 | 40 | 5 | 3.1 | 3.0 | 2.9 |
| 21 | 9.52 027 | 36 | 9.54 552 | 40 | 0.45 448 | 9.97 475 | 5 | 39 | 6 | 3.7 | 3.6 | 3.5 |
| 22 | 9.52 063 | 36 | 9.54 593 | 41 | 0.45 407 | 9.97 470 | 4 | 38 | 7 | 4.3 | 4.2 | 4.1 |
| 23 | 9.52 099 | 36 | 9.54 633 | 40 | 0.45 367 | 9.97 466 | 5 | 37 | 8 | 4.9 | 4.8 | 4.7 |
| 24 | 9.52 135 | 36 | 9.54 673 | 41 | 0.45 327 | 9.97 461 | 4 | 36 | 9 | 5.6 | 5.4 | 5.2 |
| 25 | 9.52 171 | 36 | 9.54 714 | 40 | 0.45 286 | 9.97 457 | 5 | 35 | 10 | 6.2 | 6.0 | 5.8 |
| 26 | 9.52 207 | 35 | 9.54 754 | 40 | 0.45 246 | 9.97 453 | 4 | 34 | 20 | 12.3 | 12.0 | 11.7 |
| 27 | 9.52 242 | 35 | 9.54 794 | 40 | 0.45 206 | 9.97 448 | 5 | 33 | 30 | 18.5 | 18.0 | 17.5 |
| 28 | 9.52 278 | 36 | 9.54 835 | 41 | 0.45 165 | 9.97 444 | 4 | 32 | 40 | 24.7 | 24.0 | 23.3 |
| 29 | 9.52 314 | 36 | 9.54 875 | 40 | 0.45 125 | 9.97 439 | 5 | 31 | 50 | 30.8 | 30.0 | 29.2 |
| 30 | 9.52 350 | 35 | 9.54 915 | 40 | 0.45 085 | 9.97 435 | 4 | 30 | " | 34 | 5 | 4 |
| 31 | 9.52 386 | 36 | 9.54 956 | 40 | 0.45 045 | 9.97 430 | 5 | 29 | 1 | 0.6 | 0.1 | 0.1 |
| 32 | 9.52 421 | 36 | 9.54 995 | 40 | 0.45 005 | 9.97 426 | 4 | 28 | 2 | 1.1 | 0.2 | 0.1 |
| 33 | 9.52 456 | 35 | 9.55 035 | 40 | 0.44 965 | 9.97 421 | 5 | 27 | 3 | 1.7 | 0.2 | 0.2 |
| 34 | 9.52 492 | 35 | 9.55 075 | 40 | 0.44 925 | 9.97 417 | 4 | 26 | 4 | 2.3 | 0.3 | 0.3 |
| 35 | 9.52 527 | 36 | 9.55 115 | 40 | 0.44 885 | 9.97 412 | 5 | 25 | 5 | 2.8 | 0.4 | 0.3 |
| 36 | 9.52 563 | 35 | 9.55 155 | 40 | 0.44 845 | 9.97 408 | 4 | 24 | 6 | 3.4 | 0.5 | 0.4 |
| 37 | 9.52 598 | 36 | 9.55 195 | 40 | 0.44 805 | 9.97 403 | 5 | 23 | 7 | 4.0 | 0.6 | 0.5 |
| 38 | 9.52 634 | 35 | 9.55 235 | 40 | 0.44 765 | 9.97 399 | 4 | 22 | 8 | 4.5 | 0.7 | 0.6 |
| 39 | 9.52 669 | 36 | 9.55 275 | 40 | 0.44 725 | 9.97 394 | 5 | 21 | 9 | 5.1 | 0.8 | 0.6 |
| 40 | 9.52 705 | 35 | 9.55 315 | 40 | 0.44 685 | 9.97 390 | 4 | 20 | 10 | 5.7 | 0.8 | 0.7 |
| 41 | 9.52 740 | 35 | 9.55 355 | 40 | 0.44 645 | 9.97 385 | 5 | 19 | 20 | 11.3 | 1.7 | 1.3 |
| 42 | 9.52 775 | 35 | 9.55 395 | 40 | 0.44 605 | 9.97 381 | 4 | 18 | 30 | 17.0 | 2.5 | 2.0 |
| 43 | 9.52 811 | 36 | 9.55 434 | 39 | 0.44 566 | 9.97 376 | 5 | 17 | 40 | 22.7 | 3.3 | 2.7 |
| 44 | 9.52 846 | 35 | 9.55 474 | 40 | 0.44 526 | 9.97 372 | 4 | 16 | 50 | 28.3 | 4.2 | 3.3 |
| 45 | 9.52 881 | 35 | 9.55 514 | 40 | 0.44 486 | 9.97 367 | 5 | 15 | | | | |
| 46 | 9.52 916 | 35 | 9.55 554 | 40 | 0.44 446 | 9.97 363 | 4 | 14 | | | | |
| 47 | 9.52 951 | 35 | 9.55 593 | 39 | 0.44 407 | 9.97 358 | 5 | 13 | | | | |
| 48 | 9.52 986 | 35 | 9.55 633 | 40 | 0.44 367 | 9.97 353 | 4 | 12 | | | | |
| 49 | 9.53 021 | 35 | 9.55 673 | 39 | 0.44 327 | 9.97 349 | 5 | 11 | | | | |
| 50 | 9.53 056 | 36 | 9.55 712 | 40 | 0.44 288 | 9.97 344 | 4 | 10 | | | | |
| 51 | 9.53 092 | 34 | 9.55 752 | 39 | 0.44 248 | 9.97 340 | 5 | 9 | | | | |
| 52 | 9.53 126 | 35 | 9.55 791 | 40 | 0.44 209 | 9.97 335 | 4 | 8 | | | | |
| 53 | 9.53 161 | 35 | 9.55 831 | 40 | 0.44 169 | 9.97 331 | 5 | 7 | | | | |
| 54 | 9.53 196 | 35 | 9.55 870 | 39 | 0.44 130 | 9.97 326 | 4 | 6 | | | | |
| 55 | 9.53 231 | 35 | 9.55 910 | 40 | 0.44 090 | 9.97 322 | 5 | 5 | | | | |
| 56 | 9.53 266 | 35 | 9.55 949 | 39 | 0.44 051 | 9.97 317 | 4 | 4 | | | | |
| 57 | 9.53 301 | 35 | 9.55 989 | 39 | 0.44 011 | 9.97 312 | 5 | 3 | | | | |
| 58 | 9.53 336 | 34 | 9.56 028 | 39 | 0.43 972 | 9.97 308 | 4 | 2 | | | | |
| 59 | 9.53 370 | 35 | 9.56 067 | 40 | 0.43 933 | 9.97 303 | 5 | 1 | | | | |
| 60 | 9.53 405 | | 9.56 107 | | 0.43 893 | 9.97 299 | 4 | 0 | | | | |
| ' | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | ' | P. P. | | | |

109° (289°)

(250°) 70°

LOGARITHMS OF THE FUNCTIONS (Continued)

20° (206°)

(339°) 159°

| ' | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | ' | P.P. |
|----|----------|----|----------|------|----------|----------|----|----|-------------------|
| 0 | 9.53 405 | | 9.56 107 | | 0.43 893 | 9.97 299 | | 60 | 40 39 38 |
| 1 | 9.53 440 | 35 | 9.56 146 | 39 | 0.43 854 | 9.97 294 | 5 | 59 | 1 0.7 0.6 0.6 |
| 2 | 9.53 475 | 35 | 9.56 185 | 39 | 0.43 815 | 9.97 289 | 5 | 58 | 2 1.3 1.3 1.3 |
| 3 | 9.53 509 | 34 | 9.56 224 | 39 | 0.43 776 | 9.97 285 | 4 | 57 | 3 2.0 2.0 1.9 |
| 4 | 9.53 544 | 35 | 9.56 264 | 40 | 0.43 736 | 9.97 280 | 5 | 56 | 4 2.7 2.6 2.6 |
| 5 | 9.53 578 | 34 | 9.56 303 | 39 | 0.43 697 | 9.97 276 | 4 | 55 | 5 3.3 3.2 3.2 |
| 6 | 9.53 613 | 35 | 9.56 342 | 39 | 0.43 658 | 9.97 271 | 5 | 54 | 6 4.0 3.9 3.8 |
| 7 | 9.53 647 | 34 | 9.56 381 | 39 | 0.43 619 | 9.97 266 | 5 | 53 | 7 4.7 4.6 4.4 |
| 8 | 9.53 682 | 35 | 9.56 420 | 39 | 0.43 580 | 9.97 262 | 4 | 52 | 8 5.3 5.2 5.1 |
| 9 | 9.53 716 | 34 | 9.56 459 | 39 | 0.43 541 | 9.97 257 | 5 | 51 | 9 6.0 5.8 5.7 |
| 10 | 9.53 751 | 35 | 9.56 498 | 39 | 0.43 502 | 9.97 252 | 5 | 50 | 10 6.7 6.5 6.3 |
| 11 | 9.53 785 | 34 | 9.56 537 | 39 | 0.43 463 | 9.97 248 | 4 | 49 | 20 13.3 13.0 12.7 |
| 12 | 9.53 819 | 34 | 9.56 576 | 39 | 0.43 424 | 9.97 243 | 5 | 48 | 30 20.0 19.5 19.0 |
| 13 | 9.53 854 | 35 | 9.56 615 | 39 | 0.43 385 | 9.97 238 | 5 | 47 | 40 26.7 26.0 25.3 |
| 14 | 9.53 888 | 34 | 9.56 654 | 39 | 0.43 346 | 9.97 234 | 4 | 46 | 50 33.3 32.5 31.7 |
| 15 | 9.53 922 | 34 | 9.56 693 | 39 | 0.43 307 | 9.97 229 | 5 | 45 | " 37 35 34 |
| 16 | 9.53 957 | 35 | 9.56 732 | 39 | 0.43 268 | 9.97 224 | 5 | 44 | 1 0.6 0.6 0.6 |
| 17 | 9.53 991 | 34 | 9.56 771 | 39 | 0.43 229 | 9.97 220 | 4 | 43 | 2 1.2 1.2 1.1 |
| 18 | 9.54 025 | 34 | 9.56 810 | 39 | 0.43 190 | 9.97 215 | 5 | 42 | 3 1.8 1.8 1.7 |
| 19 | 9.54 059 | 34 | 9.56 849 | 39 | 0.43 151 | 9.97 210 | 5 | 41 | 4 2.5 2.3 2.3 |
| 20 | 9.54 093 | 34 | 9.56 887 | 38 | 0.43 113 | 9.97 206 | 4 | 40 | 5 3.1 2.9 2.8 |
| 21 | 9.54 127 | 34 | 9.56 926 | 39 | 0.43 074 | 9.97 201 | 5 | 39 | 6 3.7 3.5 3.4 |
| 22 | 9.54 161 | 34 | 9.56 965 | 39 | 0.43 035 | 9.97 196 | 5 | 38 | 7 4.3 4.1 4.0 |
| 23 | 9.54 195 | 34 | 9.57 004 | 39 | 0.42 996 | 9.97 192 | 4 | 37 | 8 4.9 4.7 4.6 |
| 24 | 9.54 229 | 34 | 9.57 042 | 38 | 0.42 958 | 9.97 187 | 5 | 36 | 9 5.6 5.2 5.1 |
| 25 | 9.54 263 | 34 | 9.57 081 | 39 | 0.42 919 | 9.97 182 | 5 | 35 | 10 6.2 5.8 5.7 |
| 26 | 9.54 297 | 34 | 9.57 120 | 39 | 0.42 880 | 9.97 178 | 4 | 34 | 20 12.3 11.7 11.3 |
| 27 | 9.54 331 | 34 | 9.57 158 | 38 | 0.42 842 | 9.97 173 | 5 | 33 | 30 18.5 17.5 17.0 |
| 28 | 9.54 365 | 34 | 9.57 197 | 39 | 0.42 803 | 9.97 168 | 5 | 32 | 40 24.7 23.3 22.7 |
| 29 | 9.54 399 | 34 | 9.57 235 | 38 | 0.42 765 | 9.97 163 | 5 | 31 | 50 30.8 29.2 28.3 |
| 30 | 9.54 433 | 34 | 9.57 274 | 39 | 0.42 726 | 9.97 159 | 4 | 30 | " 33 5 4 |
| 31 | 9.54 466 | 33 | 9.57 312 | 38 | 0.42 688 | 9.97 154 | 5 | 29 | 1 0.6 0.1 0.1 |
| 32 | 9.54 500 | 34 | 9.57 351 | 39 | 0.42 649 | 9.97 149 | 5 | 28 | 2 1.1 0.2 0.1 |
| 33 | 9.54 534 | 34 | 9.57 389 | 38 | 0.42 611 | 9.97 145 | 4 | 27 | 3 1.6 0.2 0.2 |
| 34 | 9.54 567 | 33 | 9.57 428 | 39 | 0.42 572 | 9.97 140 | 5 | 26 | 4 2.2 0.3 0.3 |
| 35 | 9.54 601 | 34 | 9.57 466 | 38 | 0.42 534 | 9.97 135 | 5 | 25 | 5 2.8 0.4 0.3 |
| 36 | 9.54 635 | 34 | 9.57 504 | 38 | 0.42 496 | 9.97 130 | 5 | 24 | 6 3.3 0.5 0.4 |
| 37 | 9.54 668 | 33 | 9.57 543 | 39 | 0.42 457 | 9.97 126 | 4 | 23 | 7 3.8 0.6 0.5 |
| 38 | 9.54 702 | 34 | 9.57 581 | 38 | 0.42 419 | 9.97 121 | 5 | 22 | 8 4.4 0.7 0.6 |
| 39 | 9.54 735 | 33 | 9.57 619 | 38 | 0.42 381 | 9.97 116 | 5 | 21 | 9 5.0 0.8 0.6 |
| 40 | 9.54 769 | 34 | 9.57 658 | 39 | 0.42 342 | 9.97 111 | 5 | 20 | 10 5.5 0.8 0.7 |
| 41 | 9.54 802 | 33 | 9.57 696 | 38 | 0.42 304 | 9.97 107 | 4 | 19 | 20 11.0 1.7 1.3 |
| 42 | 9.54 836 | 34 | 9.57 734 | 38 | 0.42 266 | 9.97 102 | 5 | 18 | 30 16.5 2.5 2.0 |
| 43 | 9.54 869 | 33 | 9.57 772 | 38 | 0.42 228 | 9.97 097 | 5 | 17 | 40 22.0 3.3 2.7 |
| 44 | 9.54 903 | 34 | 9.57 810 | 38 | 0.42 190 | 9.97 092 | 5 | 16 | 50 27.5 4.2 3.3 |
| 45 | 9.54 936 | 33 | 9.57 849 | 39 | 0.42 151 | 9.97 087 | 5 | 15 | 5 5 5 |
| 46 | 9.54 969 | 33 | 9.57 887 | 38 | 0.42 113 | 9.97 083 | 4 | 14 | 14 40 39 38 |
| 47 | 9.55 003 | 34 | 9.57 925 | 38 | 0.42 075 | 9.97 078 | 5 | 13 | |
| 48 | 9.55 036 | 33 | 9.57 963 | 38 | 0.42 037 | 9.97 073 | 5 | 12 | 0 4.0 3.9 3.8 |
| 49 | 9.55 069 | 33 | 9.58 001 | 38 | 0.41 999 | 9.97 068 | 5 | 11 | 1 12.0 11.7 11.4 |
| 50 | 9.55 102 | 34 | 9.58 039 | 38 | 0.41 961 | 9.97 063 | 5 | 10 | 2 20.0 19.5 19.0 |
| 51 | 9.55 136 | 33 | 9.58 077 | 38 | 0.41 923 | 9.97 059 | 4 | 9 | 3 28.0 27.3 26.6 |
| 52 | 9.55 169 | 33 | 9.58 115 | 38 | 0.41 885 | 9.97 054 | 5 | 8 | 4 36.0 35.1 34.2 |
| 53 | 9.55 202 | 33 | 9.58 153 | 38 | 0.41 847 | 9.97 049 | 5 | 7 | 5 5 4 4 |
| 54 | 9.55 235 | 33 | 9.58 191 | 38 | 0.41 809 | 9.97 044 | 5 | 6 | 6 37 39 38 |
| 55 | 9.55 268 | 33 | 9.58 229 | 38 | 0.41 771 | 9.97 039 | 5 | 5 | 0 3.7 4.9 4.8 |
| 56 | 9.55 301 | 33 | 9.58 267 | 38 | 0.41 733 | 9.97 035 | 4 | 4 | 1 11.1 14.6 14.2 |
| 57 | 9.55 334 | 33 | 9.58 304 | 37 | 0.41 696 | 9.97 030 | 5 | 3 | 2 18.5 24.4 23.8 |
| 58 | 9.55 367 | 33 | 9.58 342 | 38 | 0.41 658 | 9.97 025 | 5 | 2 | 3 25.9 34.1 33.2 |
| 59 | 9.55 400 | 33 | 9.58 380 | 38 | 0.41 620 | 9.97 020 | 5 | 1 | 4 33.3 — — |
| 60 | 9.55 433 | 33 | 9.58 418 | 38 | 0.41 582 | 9.97 015 | 5 | 0 | |
| ' | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | ' | P.P. |

110° (290°)

(249°) 69°

LOGARITHMS OF THE FUNCTIONS (Continued)

21° (201°)

(338°) 158°

| ' | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | ' | P.P. |
|----|----------|----|----------|------|----------|----------|----|----|-------------------|
| 0 | 9.55 433 | | 9.58 418 | | 0.41 582 | 9.97 015 | | 60 | " 38 37 36 |
| 1 | 9.55 466 | 33 | 9.58 455 | 37 | 0.41 545 | 9.97 010 | 5 | 59 | 1 0.6 0.6 0.6 |
| 2 | 9.55 499 | 33 | 9.58 493 | 38 | 0.41 507 | 9.97 005 | 5 | 58 | 2 1.3 1.2 1.2 |
| 3 | 9.55 532 | 33 | 9.58 531 | 38 | 0.41 469 | 9.97 001 | 5 | 57 | 3 1.9 1.8 1.8 |
| 4 | 9.55 564 | 32 | 9.58 569 | 38 | 0.41 431 | 9.96 996 | 5 | 56 | 4 2.5 2.5 2.4 |
| 5 | 9.55 597 | 33 | 9.58 606 | 37 | 0.41 394 | 9.96 991 | 5 | 55 | 5 3.2 3.1 3.0 |
| 6 | 9.55 630 | 33 | 9.58 644 | 37 | 0.41 356 | 9.96 986 | 5 | 54 | 6 3.8 3.7 3.6 |
| 7 | 9.55 663 | 33 | 9.58 681 | 37 | 0.41 319 | 9.96 981 | 5 | 53 | 7 4.4 4.3 4.2 |
| 8 | 9.55 695 | 32 | 9.58 719 | 38 | 0.41 281 | 9.96 976 | 5 | 52 | 8 5.1 4.9 4.8 |
| 9 | 9.55 728 | 33 | 9.58 757 | 37 | 0.41 243 | 9.96 971 | 5 | 51 | 9 5.7 5.6 5.4 |
| 10 | 9.55 761 | 32 | 9.58 794 | 37 | 0.41 206 | 9.96 966 | 5 | 50 | 10 6.3 6.2 6.0 |
| 11 | 9.55 793 | 32 | 9.58 832 | 38 | 0.41 168 | 9.96 962 | 4 | 49 | 20 12.7 12.3 12.0 |
| 12 | 9.55 826 | 33 | 9.58 869 | 37 | 0.41 131 | 9.96 957 | 5 | 48 | 30 19.0 18.5 18.0 |
| 13 | 9.55 858 | 32 | 9.58 907 | 38 | 0.41 093 | 9.96 952 | 5 | 47 | 40 25.3 24.7 24.0 |
| 14 | 9.55 891 | 33 | 9.58 944 | 37 | 0.41 056 | 9.96 947 | 5 | 46 | 50 31.7 30.8 30.0 |
| 15 | 9.55 923 | 32 | 9.58 981 | 37 | 0.41 019 | 9.96 942 | 5 | 45 | " 33 32 31 |
| 16 | 9.55 956 | 32 | 9.59 019 | 38 | 0.40 981 | 9.96 937 | 5 | 44 | 1 0.6 0.6 0.6 |
| 17 | 9.55 988 | 32 | 9.59 056 | 37 | 0.40 944 | 9.96 932 | 5 | 43 | 2 1.1 1.1 1.0 |
| 18 | 9.56 021 | 33 | 9.59 094 | 38 | 0.40 906 | 9.96 927 | 5 | 42 | 3 1.6 1.6 1.6 |
| 19 | 9.56 053 | 32 | 9.59 131 | 37 | 0.40 869 | 9.96 922 | 5 | 41 | 4 2.2 2.1 2.1 |
| 20 | 9.56 085 | 32 | 9.59 168 | 37 | 0.40 832 | 9.96 917 | 5 | 40 | 5 2.8 2.7 2.6 |
| 21 | 9.56 118 | 33 | 9.59 205 | 38 | 0.40 795 | 9.96 912 | 5 | 39 | 6 3.3 3.2 3.1 |
| 22 | 9.56 150 | 32 | 9.59 243 | 37 | 0.40 757 | 9.96 907 | 5 | 38 | 7 3.8 3.7 3.6 |
| 23 | 9.56 182 | 32 | 9.59 280 | 37 | 0.40 720 | 9.96 903 | 4 | 37 | 8 4.4 4.3 4.1 |
| 24 | 9.56 215 | 33 | 9.59 317 | 37 | 0.40 683 | 9.96 898 | 5 | 36 | 9 5.0 4.8 4.6 |
| 25 | 9.56 247 | 32 | 9.59 354 | 37 | 0.40 646 | 9.96 893 | 5 | 35 | 10 5.5 5.3 5.2 |
| 26 | 9.56 279 | 32 | 9.59 391 | 37 | 0.40 609 | 9.96 888 | 5 | 34 | 20 11.0 10.7 10.3 |
| 27 | 9.56 311 | 32 | 9.59 429 | 38 | 0.40 571 | 9.96 883 | 5 | 33 | 30 16.5 16.0 15.5 |
| 28 | 9.56 343 | 32 | 9.59 466 | 37 | 0.40 534 | 9.96 878 | 5 | 32 | 40 22.0 21.3 20.7 |
| 29 | 9.56 375 | 33 | 9.59 503 | 37 | 0.40 497 | 9.96 873 | 5 | 31 | 50 27.5 26.7 25.8 |
| 30 | 9.56 408 | 32 | 9.59 540 | 37 | 0.40 460 | 9.96 868 | 5 | 30 | " 6 5 4 |
| 31 | 9.56 440 | 32 | 9.59 577 | 37 | 0.40 423 | 9.96 863 | 5 | 29 | 1 0.1 0.1 0.1 |
| 32 | 9.56 472 | 32 | 9.59 614 | 37 | 0.40 386 | 9.96 858 | 5 | 28 | 2 0.2 0.2 0.1 |
| 33 | 9.56 504 | 32 | 9.59 651 | 37 | 0.40 349 | 9.96 853 | 5 | 27 | 3 0.3 0.2 0.2 |
| 34 | 9.56 536 | 32 | 9.59 688 | 37 | 0.40 312 | 9.96 848 | 5 | 26 | 4 0.4 0.3 0.3 |
| 35 | 9.56 568 | 31 | 9.59 725 | 37 | 0.40 275 | 9.96 843 | 5 | 25 | 5 0.5 0.4 0.3 |
| 36 | 9.56 599 | 32 | 9.59 762 | 37 | 0.40 238 | 9.96 838 | 5 | 24 | 6 0.6 0.5 0.4 |
| 37 | 9.56 631 | 32 | 9.59 799 | 37 | 0.40 201 | 9.96 833 | 5 | 23 | 7 0.7 0.6 0.5 |
| 38 | 9.56 663 | 32 | 9.59 835 | 36 | 0.40 165 | 9.96 828 | 5 | 22 | 8 0.8 0.7 0.6 |
| 39 | 9.56 695 | 32 | 9.59 872 | 37 | 0.40 128 | 9.96 823 | 5 | 21 | 9 0.9 0.8 0.6 |
| 40 | 9.56 727 | 32 | 9.59 909 | 37 | 0.40 091 | 9.96 818 | 5 | 20 | 10 1.0 0.8 0.7 |
| 41 | 9.56 759 | 31 | 9.59 946 | 37 | 0.40 054 | 9.96 813 | 5 | 19 | 20 2.0 1.7 1.3 |
| 42 | 9.56 790 | 31 | 9.59 983 | 37 | 0.40 017 | 9.96 808 | 5 | 18 | 30 3.0 2.5 2.0 |
| 43 | 9.56 822 | 32 | 9.60 019 | 36 | 0.39 981 | 9.96 803 | 5 | 17 | 40 4.0 3.3 2.7 |
| 44 | 9.56 854 | 32 | 9.60 056 | 37 | 0.39 944 | 9.96 798 | 5 | 16 | 50 5.0 4.2 3.3 |
| 45 | 9.56 886 | 31 | 9.60 093 | 37 | 0.39 907 | 9.96 793 | 5 | 15 | " 6 5 5 |
| 46 | 9.56 917 | 32 | 9.60 130 | 37 | 0.39 870 | 9.96 788 | 5 | 14 | 37 38 37 |
| 47 | 9.56 949 | 32 | 9.60 166 | 36 | 0.39 834 | 9.96 783 | 5 | 13 | 0 3.1 3.8 3.7 |
| 48 | 9.56 980 | 31 | 9.60 203 | 37 | 0.39 797 | 9.96 778 | 5 | 12 | 1 9.2 11.4 11.1 |
| 49 | 9.57 012 | 32 | 9.60 240 | 36 | 0.39 760 | 9.96 772 | 6 | 11 | 2 15.4 19.0 18.5 |
| 50 | 9.57 044 | 31 | 9.60 276 | 36 | 0.39 724 | 9.96 767 | 5 | 10 | 3 21.6 26.6 25.9 |
| 51 | 9.57 075 | 31 | 9.60 313 | 37 | 0.39 687 | 9.96 762 | 5 | 9 | 4 27.8 34.2 33.3 |
| 52 | 9.57 107 | 32 | 9.60 349 | 36 | 0.39 651 | 9.96 757 | 5 | 8 | 5 33.9 — — |
| 53 | 9.57 138 | 31 | 9.60 386 | 37 | 0.39 614 | 9.96 752 | 5 | 7 | 6 — — — |
| 54 | 9.57 169 | 32 | 9.60 422 | 36 | 0.39 578 | 9.96 747 | 5 | 6 | " 6 4 4 |
| 55 | 9.57 201 | 31 | 9.60 459 | 37 | 0.39 541 | 9.96 742 | 5 | 5 | 36 38 37 |
| 56 | 9.57 232 | 32 | 9.60 495 | 36 | 0.39 505 | 9.96 737 | 5 | 4 | 0 3.6 4.8 4.6 |
| 57 | 9.57 264 | 32 | 9.60 532 | 36 | 0.39 468 | 9.96 732 | 5 | 3 | 1 10.8 14.2 13.9 |
| 58 | 9.57 295 | 31 | 9.60 568 | 37 | 0.39 432 | 9.96 727 | 5 | 2 | 2 18.0 23.8 23.1 |
| 59 | 9.57 326 | 32 | 9.60 605 | 36 | 0.39 395 | 9.96 722 | 5 | 1 | 3 25.2 33.2 32.4 |
| 60 | 9.57 358 | 32 | 9.60 641 | 36 | 0.39 359 | 9.96 717 | 5 | 0 | 4 32.4 — — |
| ' | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | ' | P.P. |

111° (291°)

(248°) 68°

LOGARITHMS OF THE FUNCTIONS (Continued)

22° (202°)

(337°) 157°

| | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | | P. P. |
|----|----------|----|----------|------|----------|----------|----|----|-------------------|
| 0 | 9.57 358 | | 9.60 641 | | 0.39 359 | 9.96 717 | 6 | 60 | " 37 36 35 |
| 1 | 9.57 389 | 31 | 9.60 677 | 36 | 0.39 323 | 9.96 711 | 5 | 59 | 1 0.6 0.6 0.6 |
| 2 | 9.57 420 | 31 | 9.60 714 | 37 | 0.39 286 | 9.96 706 | 5 | 58 | 2 1.2 1.2 1.2 |
| 3 | 9.57 451 | 31 | 9.60 750 | 36 | 0.39 250 | 9.96 701 | 5 | 57 | 3 1.8 1.8 1.8 |
| 4 | 9.57 482 | 32 | 9.60 786 | 36 | 0.39 214 | 9.96 696 | 5 | 56 | 4 2.5 2.4 2.3 |
| 5 | 9.57 514 | | 9.60 823 | | 0.39 177 | 9.96 691 | 5 | 55 | 5 3.1 3.0 2.9 |
| 6 | 9.57 545 | 31 | 9.60 859 | 36 | 0.39 141 | 9.96 686 | 5 | 54 | 6 3.7 3.6 3.5 |
| 7 | 9.57 576 | 31 | 9.60 895 | 36 | 0.39 105 | 9.96 681 | 5 | 53 | 7 4.3 4.2 4.1 |
| 8 | 9.57 607 | 31 | 9.60 931 | 36 | 0.39 069 | 9.96 676 | 5 | 52 | 8 4.9 4.8 4.7 |
| 9 | 9.57 638 | 31 | 9.60 967 | 36 | 0.39 033 | 9.96 670 | 5 | 51 | 9 5.6 5.4 5.2 |
| 10 | 9.57 669 | | 9.61 004 | | 0.38 996 | 9.96 665 | 5 | 50 | 10 6.2 6.0 5.8 |
| 11 | 9.57 700 | 31 | 9.61 040 | 36 | 0.38 960 | 9.96 660 | 5 | 49 | 20 12.3 12.0 11.7 |
| 12 | 9.57 731 | 31 | 9.61 076 | 36 | 0.38 924 | 9.96 655 | 5 | 48 | 30 18.5 18.0 17.5 |
| 13 | 9.57 762 | 31 | 9.61 112 | 36 | 0.38 888 | 9.96 650 | 5 | 47 | 40 24.7 24.0 23.3 |
| 14 | 9.57 793 | 31 | 9.61 148 | 36 | 0.38 852 | 9.96 645 | 5 | 46 | 50 30.8 30.0 29.2 |
| 15 | 9.57 824 | | 9.61 184 | | 0.38 816 | 9.96 640 | 5 | 45 | " 32 31 30 |
| 16 | 9.57 855 | 31 | 9.61 220 | 36 | 0.38 780 | 9.96 634 | 6 | 44 | 1 0.5 0.5 0.5 |
| 17 | 9.57 885 | 30 | 9.61 256 | 36 | 0.38 744 | 9.96 629 | 5 | 43 | 2 1.1 1.0 1.0 |
| 18 | 9.57 916 | 31 | 9.61 292 | 36 | 0.38 708 | 9.96 624 | 5 | 42 | 3 1.6 1.6 1.5 |
| 19 | 9.57 947 | 31 | 9.61 328 | 36 | 0.38 672 | 9.96 619 | 5 | 41 | 4 2.1 2.1 2.0 |
| 20 | 9.57 978 | | 9.61 364 | | 0.38 636 | 9.96 614 | 5 | 40 | 5 2.7 2.6 2.5 |
| 21 | 9.58 008 | 30 | 9.61 400 | 36 | 0.38 600 | 9.96 608 | 6 | 39 | 6 3.2 3.1 3.0 |
| 22 | 9.58 039 | 31 | 9.61 436 | 36 | 0.38 564 | 9.96 603 | 5 | 38 | 7 3.7 3.6 3.5 |
| 23 | 9.58 070 | 31 | 9.61 472 | 36 | 0.38 528 | 9.96 598 | 5 | 37 | 8 4.3 4.1 4.0 |
| 24 | 9.58 101 | 30 | 9.61 508 | 36 | 0.38 492 | 9.96 593 | 5 | 36 | 9 4.8 4.6 4.5 |
| 25 | 9.58 131 | | 9.61 544 | | 0.38 456 | 9.96 588 | 5 | 35 | 10 5.3 5.2 5.0 |
| 26 | 9.58 162 | 31 | 9.61 579 | 35 | 0.38 421 | 9.96 582 | 6 | 34 | 20 10.7 10.3 10.0 |
| 27 | 9.58 192 | 30 | 9.61 615 | 36 | 0.38 385 | 9.96 577 | 5 | 33 | 30 16.0 15.5 15.0 |
| 28 | 9.58 223 | 31 | 9.61 651 | 36 | 0.38 349 | 9.96 572 | 5 | 32 | 40 21.3 20.7 20.0 |
| 29 | 9.58 253 | 30 | 9.61 687 | 36 | 0.38 313 | 9.96 567 | 5 | 31 | 50 26.7 25.8 25.0 |
| 30 | 9.58 284 | | 9.61 722 | | 0.38 278 | 9.96 562 | 5 | 30 | " 29 6 5 |
| 31 | 9.58 314 | 30 | 9.61 758 | 36 | 0.38 242 | 9.96 556 | 6 | 29 | 1 0.5 0.1 0.1 |
| 32 | 9.58 345 | 31 | 9.61 794 | 36 | 0.38 206 | 9.96 551 | 5 | 28 | 2 1.0 0.2 0.2 |
| 33 | 9.58 375 | 30 | 9.61 830 | 36 | 0.38 170 | 9.96 546 | 5 | 27 | 3 1.4 0.3 0.2 |
| 34 | 9.58 406 | 31 | 9.61 865 | 36 | 0.38 135 | 9.96 541 | 5 | 26 | 4 1.9 0.4 0.3 |
| 35 | 9.58 436 | | 9.61 901 | | 0.38 099 | 9.96 535 | 6 | 25 | 5 2.4 0.5 0.4 |
| 36 | 9.58 467 | 30 | 9.61 936 | 35 | 0.38 064 | 9.96 530 | 5 | 24 | 6 2.9 0.6 0.5 |
| 37 | 9.58 497 | 30 | 9.61 972 | 36 | 0.38 028 | 9.96 525 | 5 | 23 | 7 3.4 0.7 0.6 |
| 38 | 9.58 527 | 30 | 9.62 008 | 36 | 0.37 992 | 9.96 520 | 5 | 22 | 8 3.9 0.8 0.7 |
| 39 | 9.58 557 | 31 | 9.62 043 | 36 | 0.37 957 | 9.96 514 | 5 | 21 | 9 4.4 0.9 0.8 |
| 40 | 9.58 588 | | 9.62 079 | | 0.37 921 | 9.96 509 | 6 | 20 | 10 4.8 1.0 0.8 |
| 41 | 9.58 618 | 30 | 9.62 114 | 35 | 0.37 886 | 9.96 504 | 5 | 19 | 20 9.7 2.0 1.7 |
| 42 | 9.58 648 | 30 | 9.62 150 | 36 | 0.37 850 | 9.96 498 | 5 | 18 | 30 14.5 3.0 2.5 |
| 43 | 9.58 678 | 30 | 9.62 185 | 35 | 0.37 815 | 9.96 493 | 5 | 17 | 40 19.3 4.0 3.3 |
| 44 | 9.58 709 | 31 | 9.62 221 | 36 | 0.37 779 | 9.96 488 | 5 | 16 | 50 24.2 5.0 4.2 |
| 45 | 9.58 739 | | 9.62 256 | | 0.37 744 | 9.96 483 | 5 | 15 | |
| 46 | 9.58 769 | 30 | 9.62 292 | 36 | 0.37 708 | 9.96 477 | 6 | 14 | |
| 47 | 9.58 799 | 30 | 9.62 327 | 35 | 0.37 673 | 9.96 472 | 5 | 13 | |
| 48 | 9.58 829 | 30 | 9.62 362 | 36 | 0.37 638 | 9.96 467 | 5 | 12 | |
| 49 | 9.58 859 | 30 | 9.62 398 | 36 | 0.37 602 | 9.96 461 | 6 | 11 | |
| 50 | 9.58 889 | | 9.62 433 | | 0.37 567 | 9.96 456 | 5 | 10 | |
| 51 | 9.58 919 | 30 | 9.62 468 | 35 | 0.37 532 | 9.96 451 | 5 | 9 | |
| 52 | 9.58 949 | 30 | 9.62 504 | 36 | 0.37 496 | 9.96 445 | 6 | 8 | |
| 53 | 9.58 979 | 30 | 9.62 539 | 35 | 0.37 461 | 9.96 440 | 5 | 7 | |
| 54 | 9.59 009 | 30 | 9.62 574 | 35 | 0.37 426 | 9.96 435 | 5 | 6 | |
| 55 | 9.59 039 | | 9.62 609 | | 0.37 391 | 9.96 429 | 6 | 5 | |
| 56 | 9.59 069 | 30 | 9.62 645 | 36 | 0.37 355 | 9.96 424 | 5 | 4 | |
| 57 | 9.59 098 | 29 | 9.62 680 | 35 | 0.37 320 | 9.96 419 | 5 | 3 | |
| 58 | 9.59 128 | 30 | 9.62 715 | 35 | 0.37 285 | 9.96 413 | 6 | 2 | |
| 59 | 9.59 158 | 30 | 9.62 750 | 35 | 0.37 250 | 9.96 408 | 5 | 1 | |
| 60 | 9.59 188 | | 9.62 785 | | 0.37 215 | 9.96 403 | 5 | 0 | |
| | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | | P. P. |

112° (292°)

(247°) 67

LOGARITHMS OF THE FUNCTIONS (Continued)

23° (203°)

(336°) 156°

| ' | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | ' | P. P. |
|----|----------|----|----------|------|----------|----------|----|----|-------------------|
| 0 | 9.59 188 | | 9.62 785 | | 0.37 215 | 9.96 403 | | 60 | " 36 35 34 |
| 1 | 9.59 218 | 30 | 9.62 820 | 35 | 0.37 180 | 9.96 397 | 6 | 59 | 1 0.6 0.6 0.6 |
| 2 | 9.59 247 | 29 | 9.62 855 | 35 | 0.37 145 | 9.96 392 | 5 | 58 | 2 1.2 1.2 1.1 |
| 3 | 9.59 277 | 30 | 9.62 890 | 35 | 0.37 110 | 9.96 387 | 5 | 57 | 3 1.8 1.8 1.7 |
| 4 | 9.59 307 | 30 | 9.62 926 | 36 | 0.37 074 | 9.96 381 | 6 | 56 | 4 2.4 2.3 2.3 |
| 5 | 9.59 336 | 29 | 9.62 961 | 35 | 0.37 039 | 9.96 376 | 5 | 55 | 5 3.0 2.9 2.8 |
| 6 | 9.59 366 | 30 | 9.62 996 | 35 | 0.37 004 | 9.96 370 | 6 | 54 | 6 3.6 3.5 3.4 |
| 7 | 9.59 396 | 30 | 9.63 031 | 35 | 0.36 969 | 9.96 365 | 5 | 53 | 7 4.2 4.1 4.0 |
| 8 | 9.59 425 | 29 | 9.63 066 | 35 | 0.36 934 | 9.96 360 | 5 | 52 | 8 4.8 4.7 4.6 |
| 9 | 9.59 455 | 30 | 9.63 101 | 35 | 0.36 899 | 9.96 354 | 6 | 51 | 9 5.4 5.2 5.1 |
| 10 | 9.59 484 | 29 | 9.63 135 | 34 | 0.36 865 | 9.96 349 | 5 | 50 | 10 6.0 5.8 5.7 |
| 11 | 9.59 514 | 30 | 9.63 170 | 35 | 0.36 830 | 9.96 343 | 6 | 49 | 20 12.0 11.7 11.3 |
| 12 | 9.59 543 | 29 | 9.63 205 | 35 | 0.36 795 | 9.96 338 | 5 | 48 | 30 18.0 17.5 17.0 |
| 13 | 9.59 573 | 30 | 9.63 240 | 35 | 0.36 760 | 9.96 333 | 5 | 47 | 40 24.0 23.3 22.7 |
| 14 | 9.59 602 | 29 | 9.63 275 | 35 | 0.36 725 | 9.96 327 | 6 | 46 | 50 30.0 29.2 28.3 |
| 15 | 9.59 632 | 30 | 9.63 310 | 35 | 0.36 690 | 9.96 322 | 5 | 45 | " 30 29 28 |
| 16 | 9.59 661 | 29 | 9.63 345 | 35 | 0.36 655 | 9.96 316 | 6 | 44 | 1 0.5 0.5 0.5 |
| 17 | 9.59 690 | 29 | 9.63 379 | 34 | 0.36 621 | 9.96 311 | 5 | 43 | 2 1.0 1.0 0.9 |
| 18 | 9.59 720 | 30 | 9.63 414 | 35 | 0.36 586 | 9.96 305 | 6 | 42 | 3 1.5 1.4 1.4 |
| 19 | 9.59 749 | 29 | 9.63 449 | 35 | 0.36 551 | 9.96 300 | 5 | 41 | 4 2.0 1.9 1.9 |
| 20 | 9.59 778 | 29 | 9.63 484 | 35 | 0.36 516 | 9.96 294 | 6 | 40 | 5 2.5 2.4 2.3 |
| 21 | 9.59 808 | 30 | 9.63 519 | 35 | 0.36 481 | 9.96 289 | 5 | 39 | 6 3.0 2.9 2.8 |
| 22 | 9.59 837 | 29 | 9.63 553 | 34 | 0.36 447 | 9.96 284 | 5 | 38 | 7 3.5 3.4 3.3 |
| 23 | 9.59 866 | 29 | 9.63 588 | 35 | 0.36 412 | 9.96 278 | 6 | 37 | 8 4.0 3.9 3.7 |
| 24 | 9.59 895 | 29 | 9.63 623 | 35 | 0.36 377 | 9.96 273 | 5 | 36 | 9 4.5 4.4 4.2 |
| 25 | 9.59 924 | 29 | 9.63 657 | 34 | 0.36 343 | 9.96 267 | 6 | 35 | 10 5.0 4.8 4.7 |
| 26 | 9.59 954 | 30 | 9.63 692 | 35 | 0.36 308 | 9.96 262 | 5 | 34 | 20 10.0 9.7 9.3 |
| 27 | 9.59 983 | 29 | 9.63 726 | 34 | 0.36 274 | 9.96 256 | 6 | 33 | 30 15.0 14.5 14.0 |
| 28 | 9.60 012 | 29 | 9.63 761 | 35 | 0.36 239 | 9.96 251 | 5 | 32 | 40 20.0 19.3 18.7 |
| 29 | 9.60 041 | 29 | 9.63 796 | 35 | 0.36 204 | 9.96 245 | 6 | 31 | 50 25.0 24.2 23.3 |
| 30 | 9.60 070 | 29 | 9.63 830 | 34 | 0.36 170 | 9.96 240 | 5 | 30 | " 6 5 |
| 31 | 9.60 099 | 29 | 9.63 865 | 35 | 0.36 135 | 9.96 234 | 6 | 29 | 1 0.1 0.1 |
| 32 | 9.60 128 | 29 | 9.63 899 | 34 | 0.36 101 | 9.96 229 | 5 | 28 | 2 0.2 0.2 |
| 33 | 9.60 157 | 29 | 9.63 934 | 35 | 0.36 066 | 9.96 223 | 6 | 27 | 3 0.3 0.2 |
| 34 | 9.60 186 | 29 | 9.63 968 | 34 | 0.36 032 | 9.96 218 | 5 | 26 | 4 0.4 0.3 |
| 35 | 9.60 215 | 29 | 9.64 003 | 35 | 0.35 997 | 9.96 212 | 6 | 25 | 5 0.5 0.4 |
| 36 | 9.60 244 | 29 | 9.64 037 | 34 | 0.35 963 | 9.96 207 | 5 | 24 | 6 0.6 0.5 |
| 37 | 9.60 273 | 29 | 9.64 072 | 35 | 0.35 928 | 9.96 201 | 6 | 23 | 7 0.7 0.6 |
| 38 | 9.60 302 | 29 | 9.64 106 | 34 | 0.35 894 | 9.96 196 | 5 | 22 | 8 0.8 0.7 |
| 39 | 9.60 331 | 28 | 9.64 140 | 35 | 0.35 860 | 9.96 190 | 6 | 21 | 9 0.9 0.8 |
| 40 | 9.60 359 | 29 | 9.64 175 | 34 | 0.35 825 | 9.96 185 | 5 | 20 | 10 1.0 0.8 |
| 41 | 9.60 388 | 29 | 9.64 209 | 34 | 0.35 791 | 9.96 179 | 6 | 19 | 20 2.0 1.7 |
| 42 | 9.60 417 | 29 | 9.64 243 | 35 | 0.35 757 | 9.96 174 | 5 | 18 | 30 3.0 2.5 |
| 43 | 9.60 446 | 29 | 9.64 278 | 35 | 0.35 722 | 9.96 168 | 6 | 17 | 40 4.0 3.3 |
| 44 | 9.60 474 | 28 | 9.64 312 | 34 | 0.35 688 | 9.96 162 | 6 | 16 | 50 5.0 4.2 |
| 45 | 9.60 503 | 29 | 9.64 346 | 35 | 0.35 654 | 9.96 157 | 5 | 15 | 6 6 6 |
| 46 | 9.60 532 | 29 | 9.64 381 | 35 | 0.35 619 | 9.96 151 | 6 | 14 | 36 35 34 |
| 47 | 9.60 561 | 29 | 9.64 415 | 34 | 0.35 585 | 9.96 146 | 5 | 13 | 0 3.0 2.9 2.8 |
| 48 | 9.60 589 | 28 | 9.64 449 | 34 | 0.35 551 | 9.96 140 | 6 | 12 | 1 9.0 8.8 8.5 |
| 49 | 9.60 618 | 28 | 9.64 483 | 34 | 0.35 517 | 9.96 135 | 5 | 11 | 2 15.0 14.6 14.2 |
| 50 | 9.60 646 | 28 | 9.64 517 | 34 | 0.35 483 | 9.96 129 | 6 | 10 | 3 21.0 20.4 19.8 |
| 51 | 9.60 675 | 29 | 9.64 552 | 35 | 0.35 448 | 9.96 123 | 5 | 9 | 4 27.0 26.2 25.5 |
| 52 | 9.60 704 | 29 | 9.64 586 | 34 | 0.35 414 | 9.96 118 | 6 | 8 | 5 33.0 32.1 31.2 |
| 53 | 9.60 732 | 28 | 9.64 620 | 34 | 0.35 380 | 9.96 112 | 5 | 7 | 6 5 5 |
| 54 | 9.60 761 | 28 | 9.64 654 | 34 | 0.35 346 | 9.96 107 | 6 | 6 | 35 34 |
| 55 | 9.60 789 | 28 | 9.64 688 | 34 | 0.35 312 | 9.96 101 | 5 | 5 | 0 3.5 3.4 |
| 56 | 9.60 818 | 29 | 9.64 722 | 34 | 0.35 278 | 9.96 095 | 6 | 4 | 1 10.5 10.2 |
| 57 | 9.60 846 | 29 | 9.64 756 | 34 | 0.35 244 | 9.96 090 | 5 | 3 | 2 17.5 17.0 |
| 58 | 9.60 875 | 28 | 9.64 790 | 34 | 0.35 210 | 9.96 084 | 6 | 2 | 3 24.5 23.8 |
| 59 | 9.60 903 | 28 | 9.64 824 | 34 | 0.35 176 | 9.96 079 | 5 | 1 | 4 31.5 30.6 |
| 60 | 9.60 931 | 28 | 9.64 858 | 34 | 0.35 142 | 9.96 073 | 6 | 0 | 5 |
| ' | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | ' | P. P. |

113° (293°)

(246°) 66°

LOGARITHMS OF THE FUNCTIONS (Continued)

24° (204°)

(335°) 155°

| | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | | P.P. |
|----|----------|----|----------|------|----------|----------|----|----|-------------------|
| 0 | 9.60 931 | | 9.64 858 | | 0.35 142 | 9.96 073 | | 60 | |
| 1 | 9.60 960 | 28 | 9.64 892 | 34 | 0.35 108 | 9.96 067 | 6 | 59 | |
| 2 | 9.60 988 | 28 | 9.64 926 | 34 | 0.35 074 | 9.96 062 | 5 | 58 | |
| 3 | 9.61 016 | 28 | 9.64 960 | 34 | 0.35 040 | 9.96 056 | 5 | 57 | " 34 33 |
| 4 | 9.61 045 | 29 | 9.64 994 | 34 | 0.35 006 | 9.96 050 | 6 | 56 | 1 0.6 0.6 |
| 5 | 9.61 073 | 28 | 9.65 028 | 34 | 0.34 972 | 9.96 045 | 5 | 55 | 1.1 1.1 |
| 6 | 9.61 101 | 28 | 9.65 062 | 34 | 0.34 938 | 9.96 039 | 6 | 54 | 3 1.7 1.6 |
| 7 | 9.61 129 | 28 | 9.65 096 | 34 | 0.34 904 | 9.96 034 | 5 | 53 | 4 2.3 2.2 |
| 8 | 9.61 158 | 29 | 9.65 130 | 34 | 0.34 870 | 9.96 028 | 5 | 52 | 5 2.8 2.8 |
| 9 | 9.61 186 | 28 | 9.65 164 | 33 | 0.34 836 | 9.96 022 | 6 | 51 | 6 3.4 3.3 |
| 10 | 9.61 214 | 28 | 9.65 197 | 33 | 0.34 803 | 9.96 017 | 5 | 50 | 7 4.0 3.8 |
| 11 | 9.61 242 | 28 | 9.65 231 | 34 | 0.34 769 | 9.96 011 | 6 | 49 | 8 4.5 4.4 |
| 12 | 9.61 270 | 28 | 9.65 265 | 34 | 0.34 735 | 9.96 005 | 6 | 48 | 9 5.1 5.0 |
| 13 | 9.61 298 | 28 | 9.65 299 | 34 | 0.34 701 | 9.96 000 | 5 | 47 | 10 5.7 5.5 |
| 14 | 9.61 326 | 28 | 9.65 333 | 33 | 0.34 667 | 9.95 994 | 6 | 46 | 20 11.3 11.0 |
| 15 | 9.61 354 | 28 | 9.65 366 | 34 | 0.34 634 | 9.95 988 | 6 | 45 | 30 17.0 16.5 |
| 16 | 9.61 382 | 28 | 9.65 400 | 34 | 0.34 600 | 9.95 982 | 6 | 44 | 40 22.7 22.0 |
| 17 | 9.61 411 | 29 | 9.65 434 | 34 | 0.34 566 | 9.95 977 | 5 | 43 | 50 28.3 27.5 |
| 18 | 9.61 438 | 28 | 9.65 467 | 33 | 0.34 533 | 9.95 971 | 6 | 42 | " 29 28 27 |
| 19 | 9.61 466 | 28 | 9.65 501 | 34 | 0.34 499 | 9.95 965 | 6 | 41 | 1 0.5 0.5 0.4 |
| 20 | 9.61 494 | 28 | 9.65 535 | 33 | 0.34 465 | 9.95 960 | 5 | 40 | 2 1.0 0.9 0.9 |
| 21 | 9.61 522 | 28 | 9.65 568 | 34 | 0.34 432 | 9.95 954 | 6 | 39 | 3 1.4 1.4 1.4 |
| 22 | 9.61 550 | 28 | 9.65 602 | 34 | 0.34 398 | 9.95 948 | 6 | 38 | 4 1.9 1.9 1.8 |
| 23 | 9.61 578 | 28 | 9.65 636 | 34 | 0.34 364 | 9.95 942 | 5 | 37 | 5 2.4 2.3 2.2 |
| 24 | 9.61 606 | 28 | 9.65 669 | 33 | 0.34 331 | 9.95 937 | 6 | 36 | 6 2.9 2.8 2.7 |
| 25 | 9.61 634 | 28 | 9.65 703 | 34 | 0.34 297 | 9.95 931 | 5 | 35 | 7 3.4 3.3 3.2 |
| 26 | 9.61 662 | 28 | 9.65 736 | 33 | 0.34 264 | 9.95 925 | 6 | 34 | 8 3.9 3.7 3.6 |
| 27 | 9.61 689 | 27 | 9.65 770 | 34 | 0.34 230 | 9.95 920 | 5 | 33 | 9 4.4 4.2 4.0 |
| 28 | 9.61 717 | 28 | 9.65 803 | 33 | 0.34 197 | 9.95 914 | 6 | 32 | 10 4.8 4.7 4.5 |
| 29 | 9.61 745 | 28 | 9.65 837 | 34 | 0.34 163 | 9.95 908 | 5 | 31 | 20 9.7 9.3 9.0 |
| 30 | 9.61 773 | 27 | 9.65 870 | 33 | 0.34 130 | 9.95 902 | 6 | 30 | 30 14.5 14.0 13.5 |
| 31 | 9.61 800 | 28 | 9.65 904 | 34 | 0.34 096 | 9.95 897 | 5 | 29 | 40 19.3 18.7 18.0 |
| 32 | 9.61 828 | 28 | 9.65 937 | 33 | 0.34 063 | 9.95 891 | 6 | 28 | 50 24.2 23.3 22.5 |
| 33 | 9.61 856 | 28 | 9.65 971 | 34 | 0.34 029 | 9.95 885 | 5 | 27 | " 6 5 |
| 34 | 9.61 883 | 28 | 9.66 004 | 33 | 0.33 996 | 9.95 879 | 6 | 26 | 1 0.1 0.1 |
| 35 | 9.61 911 | 28 | 9.66 038 | 34 | 0.33 962 | 9.95 873 | 5 | 25 | 2 0.2 0.2 |
| 36 | 9.61 939 | 27 | 9.66 071 | 33 | 0.33 929 | 9.95 868 | 6 | 24 | 3 0.3 0.2 |
| 37 | 9.61 966 | 28 | 9.66 104 | 34 | 0.33 896 | 9.95 862 | 5 | 23 | 4 0.4 0.3 |
| 38 | 9.61 994 | 28 | 9.66 138 | 33 | 0.33 862 | 9.95 856 | 6 | 22 | 5 0.5 0.4 |
| 39 | 9.62 021 | 27 | 9.66 171 | 34 | 0.33 829 | 9.95 850 | 5 | 21 | 6 0.6 0.5 |
| 40 | 9.62 049 | 28 | 9.66 204 | 33 | 0.33 796 | 9.95 844 | 6 | 20 | 7 0.7 0.6 |
| 41 | 9.62 076 | 28 | 9.66 238 | 34 | 0.33 762 | 9.95 839 | 5 | 19 | 8 0.8 0.7 |
| 42 | 9.62 104 | 28 | 9.66 271 | 33 | 0.33 729 | 9.95 833 | 6 | 18 | 9 0.9 0.8 |
| 43 | 9.62 131 | 27 | 9.66 304 | 34 | 0.33 696 | 9.95 827 | 5 | 17 | 10 1.0 0.8 |
| 44 | 9.62 159 | 28 | 9.66 337 | 33 | 0.33 663 | 9.95 821 | 6 | 16 | 20 2.0 1.7 |
| 45 | 9.62 186 | 28 | 9.66 371 | 34 | 0.33 629 | 9.95 815 | 5 | 15 | 30 3.0 2.5 |
| 46 | 9.62 214 | 27 | 9.66 404 | 33 | 0.33 596 | 9.95 810 | 6 | 14 | 40 4.0 3.3 |
| 47 | 9.62 241 | 27 | 9.66 437 | 34 | 0.33 563 | 9.95 804 | 5 | 13 | 50 5.0 4.2 |
| 48 | 9.62 268 | 28 | 9.66 470 | 33 | 0.33 530 | 9.95 798 | 6 | 12 | |
| 49 | 9.62 296 | 27 | 9.66 503 | 34 | 0.33 497 | 9.95 792 | 5 | 11 | |
| 50 | 9.62 323 | 27 | 9.66 537 | 33 | 0.33 463 | 9.95 786 | 6 | 10 | 6 6 5 |
| 51 | 9.62 350 | 28 | 9.66 570 | 34 | 0.33 430 | 9.95 780 | 5 | 9 | 34 33 34 |
| 52 | 9.62 377 | 27 | 9.66 603 | 33 | 0.33 397 | 9.95 775 | 6 | 8 | 0' 2.8 2.8 3.4 |
| 53 | 9.62 405 | 28 | 9.66 636 | 34 | 0.33 364 | 9.95 769 | 5 | 7 | 1 8.5 8.2 10.2 |
| 54 | 9.62 432 | 27 | 9.66 669 | 33 | 0.33 331 | 9.95 763 | 6 | 6 | 2 14.2 13.8 17.0 |
| 55 | 9.62 459 | 27 | 9.66 702 | 34 | 0.33 298 | 9.95 757 | 5 | 5 | 3 19.8 19.2 23.8 |
| 56 | 9.62 486 | 28 | 9.66 735 | 33 | 0.33 265 | 9.95 751 | 6 | 4 | 4 25.5 24.8 30.6 |
| 57 | 9.62 513 | 27 | 9.66 768 | 34 | 0.33 232 | 9.95 745 | 5 | 3 | 5 31.2 30.2 |
| 58 | 9.62 541 | 28 | 9.66 801 | 33 | 0.33 199 | 9.95 739 | 6 | 2 | |
| 59 | 9.62 568 | 27 | 9.66 834 | 34 | 0.33 166 | 9.95 733 | 5 | 1 | |
| 60 | 9.62 595 | 27 | 9.66 867 | 33 | 0.33 133 | 9.95 728 | 6 | 0 | |
| | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | | P.P. |

114° (294°)

(245°) 65°

LOGARITHMS OF THE FUNCTIONS (Continued)

25° (205°)

(334°) 154°

| | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | | P.P. |
|----|----------|----|----------|------|----------|----------|----|----|--------------|
| 0 | 9.62 595 | | 9.66 867 | | 0.33 133 | 9.95 728 | | 60 | |
| 1 | 9.62 622 | 27 | 9.66 900 | 33 | 0.33 100 | 9.95 722 | 6 | 59 | |
| 2 | 9.62 649 | 27 | 9.66 933 | 33 | 0.33 067 | 9.95 716 | 6 | 58 | |
| 3 | 9.62 676 | 27 | 9.66 966 | 33 | 0.33 034 | 9.95 710 | 6 | 57 | " 33 32 |
| 4 | 9.62 703 | 27 | 9.66 999 | 33 | 0.33 001 | 9.95 704 | 6 | 56 | 1 0.6 0.5 |
| 5 | 9.62 730 | 27 | 9.67 032 | 33 | 0.32 968 | 9.95 698 | 6 | 55 | 2 1.1 1.1 |
| 6 | 9.62 757 | 27 | 9.67 065 | 33 | 0.32 935 | 9.95 692 | 6 | 54 | 3 1.6 1.6 |
| 7 | 9.62 784 | 27 | 9.67 098 | 33 | 0.32 902 | 9.95 686 | 6 | 53 | 4 2.2 2.1 |
| 8 | 9.62 811 | 27 | 9.67 131 | 33 | 0.32 869 | 9.95 680 | 6 | 52 | 5 2.8 2.7 |
| 9 | 9.62 838 | 27 | 9.67 163 | 33 | 0.32 837 | 9.95 674 | 6 | 51 | 6 3.3 3.2 |
| 10 | 9.62 865 | 27 | 9.67 196 | 33 | 0.32 804 | 9.95 668 | 6 | 50 | 7 3.8 3.7 |
| 11 | 9.62 892 | 27 | 9.67 229 | 33 | 0.32 771 | 9.95 663 | 5 | 49 | 8 4.4 4.3 |
| 12 | 9.62 918 | 26 | 9.67 262 | 33 | 0.32 738 | 9.95 657 | 6 | 48 | 9 5.0 4.8 |
| 13 | 9.62 945 | 27 | 9.67 295 | 33 | 0.32 705 | 9.95 651 | 6 | 47 | 10 5.5 5.3 |
| 14 | 9.62 972 | 27 | 9.67 327 | 32 | 0.32 673 | 9.95 645 | 6 | 46 | 20 11.0 10.7 |
| 15 | 9.62 999 | 27 | 9.67 360 | 33 | 0.32 640 | 9.95 639 | 6 | 45 | 30 16.5 16.0 |
| 16 | 9.63 026 | 27 | 9.67 393 | 33 | 0.32 607 | 9.95 633 | 6 | 44 | 40 22.0 21.3 |
| 17 | 9.63 052 | 26 | 9.67 426 | 33 | 0.32 574 | 9.95 627 | 6 | 43 | 50 27.5 26.7 |
| 18 | 9.63 079 | 27 | 9.67 458 | 32 | 0.32 542 | 9.95 621 | 6 | 42 | " 27 26 |
| 19 | 9.63 106 | 27 | 9.67 491 | 33 | 0.32 509 | 9.95 615 | 6 | 41 | 1 0.4 0.4 |
| 20 | 9.63 133 | 27 | 9.67 524 | 33 | 0.32 476 | 9.95 609 | 6 | 40 | 2 0.9 0.9 |
| 21 | 9.63 159 | 26 | 9.67 556 | 32 | 0.32 444 | 9.95 603 | 6 | 39 | 3 1.4 1.3 |
| 22 | 9.63 186 | 27 | 9.67 589 | 33 | 0.32 411 | 9.95 597 | 6 | 38 | 4 1.8 1.7 |
| 23 | 9.63 213 | 27 | 9.67 622 | 33 | 0.32 378 | 9.95 591 | 6 | 37 | 5 2.2 2.2 |
| 24 | 9.63 239 | 26 | 9.67 654 | 32 | 0.32 346 | 9.95 585 | 6 | 36 | 6 2.7 2.6 |
| 25 | 9.63 266 | 26 | 9.67 687 | 32 | 0.32 313 | 9.95 579 | 6 | 35 | 7 3.2 3.0 |
| 26 | 9.63 292 | 27 | 9.67 719 | 32 | 0.32 281 | 9.95 573 | 6 | 34 | 8 3.6 3.5 |
| 27 | 9.63 319 | 27 | 9.67 752 | 33 | 0.32 248 | 9.95 567 | 6 | 33 | 9 4.0 3.9 |
| 28 | 9.63 345 | 26 | 9.67 785 | 32 | 0.32 215 | 9.95 561 | 6 | 32 | 10 4.5 4.3 |
| 29 | 9.63 372 | 27 | 9.67 817 | 32 | 0.32 183 | 9.95 555 | 6 | 31 | 20 9.0 8.7 |
| 30 | 9.63 398 | 26 | 9.67 850 | 33 | 0.32 150 | 9.95 549 | 6 | 30 | 30 13.5 13.0 |
| 31 | 9.63 425 | 27 | 9.67 882 | 32 | 0.32 118 | 9.95 543 | 6 | 29 | 40 18.0 17.3 |
| 32 | 9.63 451 | 26 | 9.67 915 | 33 | 0.32 085 | 9.95 537 | 6 | 28 | 50 22.5 21.7 |
| 33 | 9.63 478 | 27 | 9.67 947 | 32 | 0.32 053 | 9.95 531 | 6 | 27 | 7 7 5 |
| 34 | 9.63 504 | 26 | 9.67 980 | 32 | 0.32 020 | 9.95 525 | 6 | 26 | 1 0.1 0.1 |
| 35 | 9.63 531 | 27 | 9.68 012 | 32 | 0.31 988 | 9.95 519 | 6 | 25 | 2 0.2 0.2 |
| 36 | 9.63 557 | 26 | 9.68 044 | 32 | 0.31 956 | 9.95 513 | 6 | 24 | 3 0.4 0.3 |
| 37 | 9.63 583 | 27 | 9.68 077 | 33 | 0.31 923 | 9.95 507 | 6 | 23 | 4 0.5 0.4 |
| 38 | 9.63 610 | 26 | 9.68 109 | 32 | 0.31 891 | 9.95 500 | 7 | 22 | 5 0.6 0.5 |
| 39 | 9.63 636 | 26 | 9.68 142 | 33 | 0.31 858 | 9.95 494 | 6 | 21 | 6 0.7 0.6 |
| 40 | 9.63 662 | 27 | 9.68 174 | 32 | 0.31 826 | 9.95 488 | 6 | 20 | 7 0.8 0.7 |
| 41 | 9.63 689 | 26 | 9.68 206 | 33 | 0.31 794 | 9.95 482 | 6 | 19 | 8 0.9 0.8 |
| 42 | 9.63 715 | 27 | 9.68 239 | 32 | 0.31 761 | 9.95 476 | 6 | 18 | 9 1.0 0.9 |
| 43 | 9.63 741 | 26 | 9.68 271 | 32 | 0.31 729 | 9.95 470 | 6 | 17 | 10 1.2 1.0 |
| 44 | 9.63 767 | 27 | 9.68 303 | 33 | 0.31 697 | 9.95 464 | 6 | 16 | 20 2.3 2.0 |
| 45 | 9.63 794 | 26 | 9.68 336 | 32 | 0.31 664 | 9.95 458 | 6 | 15 | 30 3.5 3.0 |
| 46 | 9.63 820 | 27 | 9.68 368 | 32 | 0.31 632 | 9.95 452 | 6 | 14 | 40 4.7 4.0 |
| 47 | 9.63 846 | 26 | 9.68 400 | 32 | 0.31 600 | 9.95 446 | 6 | 13 | 50 5.8 5.0 |
| 48 | 9.63 872 | 27 | 9.68 432 | 33 | 0.31 568 | 9.95 440 | 6 | 12 | |
| 49 | 9.63 898 | 26 | 9.68 465 | 32 | 0.31 535 | 9.95 434 | 6 | 11 | |
| 50 | 9.63 924 | 27 | 9.68 497 | 32 | 0.31 503 | 9.95 427 | 7 | 10 | 7 7 5 |
| 51 | 9.63 950 | 26 | 9.68 529 | 32 | 0.31 471 | 9.95 421 | 6 | 9 | 32 32 33 |
| 52 | 9.63 976 | 27 | 9.68 561 | 32 | 0.31 439 | 9.95 415 | 6 | 8 | 0 2.3 2.7 |
| 53 | 9.64 002 | 26 | 9.68 593 | 32 | 0.31 407 | 9.95 409 | 6 | 7 | 1 6.9 8.0 |
| 54 | 9.64 028 | 27 | 9.68 626 | 33 | 0.31 374 | 9.95 403 | 6 | 6 | 2 11.4 13.3 |
| 55 | 9.64 054 | 26 | 9.68 658 | 32 | 0.31 342 | 9.95 397 | 6 | 5 | 3 16.0 18.7 |
| 56 | 9.64 080 | 27 | 9.68 690 | 32 | 0.31 310 | 9.95 391 | 6 | 4 | 4 20.6 24.0 |
| 57 | 9.64 106 | 26 | 9.68 722 | 32 | 0.31 278 | 9.95 384 | 7 | 3 | 5 25.1 29.3 |
| 58 | 9.64 132 | 27 | 9.68 754 | 32 | 0.31 246 | 9.95 378 | 6 | 2 | 6 29.7 — — |
| 59 | 9.64 158 | 26 | 9.68 786 | 32 | 0.31 214 | 9.95 372 | 6 | 1 | |
| 60 | 9.64 184 | 27 | 9.68 818 | 32 | 0.31 182 | 9.95 366 | 6 | 0 | |
| | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | | P.P. |

115° (295°)

(244°) 64°

LOGARITHMS OF THE FUNCTIONS (Continued)

26° (206°)

(333°) 153°

| ' | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | ' | P.P. |
|----|----------|----|----------|------|----------|----------|----|----|------|
| 0 | 9.64 184 | | 9.68 818 | 32 | 0.31 182 | 9.95 366 | 6 | 60 | |
| 1 | 9.64 210 | 26 | 9.68 850 | 32 | 0.31 150 | 9.95 360 | 6 | 59 | |
| 2 | 9.64 236 | 26 | 9.68 882 | 32 | 0.31 118 | 9.95 354 | 6 | 58 | |
| 3 | 9.64 262 | 26 | 9.68 914 | 32 | 0.31 086 | 9.95 348 | 6 | 57 | |
| 4 | 9.64 288 | 26 | 9.68 946 | 32 | 0.31 054 | 9.95 341 | 6 | 56 | |
| 5 | 9.64 313 | 25 | 9.68 978 | 32 | 0.31 022 | 9.95 335 | 6 | 55 | |
| 6 | 9.64 339 | 26 | 9.69 010 | 32 | 0.30 990 | 9.95 329 | 6 | 54 | |
| 7 | 9.64 365 | 26 | 9.69 042 | 32 | 0.30 958 | 9.95 323 | 6 | 53 | |
| 8 | 9.64 391 | 26 | 9.69 074 | 32 | 0.30 926 | 9.95 317 | 6 | 52 | |
| 9 | 9.64 417 | 25 | 9.69 106 | 32 | 0.30 894 | 9.95 310 | 6 | 51 | |
| 10 | 9.64 442 | 26 | 9.69 138 | 32 | 0.30 862 | 9.95 304 | 6 | 50 | |
| 11 | 9.64 468 | 26 | 9.69 170 | 32 | 0.30 830 | 9.95 298 | 6 | 49 | |
| 12 | 9.64 494 | 26 | 9.69 202 | 32 | 0.30 798 | 9.95 292 | 6 | 48 | |
| 13 | 9.64 519 | 25 | 9.69 234 | 32 | 0.30 766 | 9.95 286 | 6 | 47 | |
| 14 | 9.64 545 | 26 | 9.69 266 | 32 | 0.30 734 | 9.95 279 | 6 | 46 | |
| 15 | 9.64 571 | 25 | 9.69 298 | 31 | 0.30 702 | 9.95 273 | 6 | 45 | |
| 16 | 9.64 596 | 25 | 9.69 329 | 31 | 0.30 671 | 9.95 267 | 6 | 44 | |
| 17 | 9.64 622 | 26 | 9.69 361 | 32 | 0.30 639 | 9.95 261 | 6 | 43 | |
| 18 | 9.64 647 | 25 | 9.69 393 | 32 | 0.30 607 | 9.95 254 | 6 | 42 | |
| 19 | 9.64 673 | 26 | 9.69 425 | 32 | 0.30 575 | 9.95 248 | 6 | 41 | |
| 20 | 9.64 698 | 25 | 9.69 457 | 32 | 0.30 543 | 9.95 242 | 6 | 40 | |
| 21 | 9.64 724 | 26 | 9.69 488 | 31 | 0.30 512 | 9.95 236 | 6 | 39 | |
| 22 | 9.64 749 | 25 | 9.69 520 | 32 | 0.30 480 | 9.95 229 | 6 | 38 | |
| 23 | 9.64 775 | 26 | 9.69 552 | 32 | 0.30 448 | 9.95 223 | 6 | 37 | |
| 24 | 9.64 800 | 25 | 9.69 584 | 32 | 0.30 416 | 9.95 217 | 6 | 36 | |
| 25 | 9.64 826 | 26 | 9.69 615 | 31 | 0.30 385 | 9.95 211 | 6 | 35 | |
| 26 | 9.64 851 | 25 | 9.69 647 | 32 | 0.30 353 | 9.95 204 | 6 | 34 | |
| 27 | 9.64 877 | 26 | 9.69 679 | 31 | 0.30 321 | 9.95 198 | 6 | 33 | |
| 28 | 9.64 902 | 25 | 9.69 710 | 32 | 0.30 290 | 9.95 192 | 6 | 32 | |
| 29 | 9.64 927 | 26 | 9.69 742 | 32 | 0.30 258 | 9.95 185 | 6 | 31 | |
| 30 | 9.64 953 | 25 | 9.69 774 | 31 | 0.30 226 | 9.95 179 | 6 | 30 | |
| 31 | 9.64 978 | 26 | 9.69 806 | 32 | 0.30 195 | 9.95 173 | 6 | 29 | |
| 32 | 9.65 003 | 25 | 9.69 837 | 31 | 0.30 163 | 9.95 167 | 6 | 28 | |
| 33 | 9.65 029 | 26 | 9.69 868 | 31 | 0.30 132 | 9.95 160 | 6 | 27 | |
| 34 | 9.65 054 | 25 | 9.69 900 | 32 | 0.30 100 | 9.95 154 | 6 | 26 | |
| 35 | 9.65 079 | 26 | 9.69 932 | 31 | 0.30 068 | 9.95 148 | 6 | 25 | |
| 36 | 9.65 104 | 25 | 9.69 963 | 31 | 0.30 037 | 9.95 141 | 6 | 24 | |
| 37 | 9.65 130 | 26 | 9.69 995 | 32 | 0.30 006 | 9.95 135 | 6 | 23 | |
| 38 | 9.65 155 | 25 | 9.70 026 | 31 | 0.29 974 | 9.95 129 | 6 | 22 | |
| 39 | 9.65 180 | 26 | 9.70 058 | 32 | 0.29 942 | 9.95 122 | 6 | 21 | |
| 40 | 9.65 205 | 25 | 9.70 089 | 31 | 0.29 911 | 9.95 116 | 6 | 20 | |
| 41 | 9.65 230 | 26 | 9.70 121 | 31 | 0.29 879 | 9.95 110 | 6 | 19 | |
| 42 | 9.65 255 | 25 | 9.70 152 | 31 | 0.29 848 | 9.95 103 | 6 | 18 | |
| 43 | 9.65 281 | 26 | 9.70 184 | 32 | 0.29 816 | 9.95 097 | 6 | 17 | |
| 44 | 9.65 306 | 25 | 9.70 215 | 31 | 0.29 785 | 9.95 090 | 6 | 16 | |
| 45 | 9.65 331 | 26 | 9.70 247 | 32 | 0.29 753 | 9.95 084 | 6 | 15 | |
| 46 | 9.65 356 | 25 | 9.70 278 | 31 | 0.29 722 | 9.95 078 | 6 | 14 | |
| 47 | 9.65 381 | 26 | 9.70 309 | 32 | 0.29 691 | 9.95 071 | 6 | 13 | |
| 48 | 9.65 406 | 25 | 9.70 341 | 31 | 0.29 659 | 9.95 065 | 6 | 12 | |
| 49 | 9.65 431 | 26 | 9.70 372 | 32 | 0.29 628 | 9.95 059 | 6 | 11 | |
| 50 | 9.65 456 | 25 | 9.70 404 | 31 | 0.29 596 | 9.95 052 | 6 | 10 | |
| 51 | 9.65 481 | 26 | 9.70 435 | 31 | 0.29 565 | 9.95 046 | 6 | 9 | |
| 52 | 9.65 506 | 25 | 9.70 466 | 32 | 0.29 534 | 9.95 039 | 6 | 8 | |
| 53 | 9.65 531 | 26 | 9.70 498 | 31 | 0.29 502 | 9.95 033 | 6 | 7 | |
| 54 | 9.65 556 | 25 | 9.70 529 | 31 | 0.29 471 | 9.95 027 | 6 | 6 | |
| 55 | 9.65 580 | 26 | 9.70 560 | 32 | 0.29 440 | 9.95 020 | 6 | 5 | |
| 56 | 9.65 605 | 25 | 9.70 592 | 31 | 0.29 408 | 9.95 014 | 6 | 4 | |
| 57 | 9.65 630 | 26 | 9.70 623 | 32 | 0.29 377 | 9.95 007 | 6 | 3 | |
| 58 | 9.65 655 | 25 | 9.70 654 | 31 | 0.29 346 | 9.95 001 | 6 | 2 | |
| 59 | 9.65 680 | 26 | 9.70 685 | 32 | 0.29 315 | 9.94 995 | 6 | 1 | |
| 60 | 9.65 705 | 25 | 9.70 717 | 32 | 0.29 283 | 9.94 988 | 6 | 0 | |
| ' | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | ' | P.P. |

116° (296°)

(243°) 63°

LOGARITHMS OF THE FUNCTIONS (Continued)

27° (207°)

(332°) 152°

| | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | | P.P. |
|----|----------|----|----------|------|----------|----------|----|----|-------------------|
| 0 | 9.65 705 | | 9.70 717 | | 0.29 283 | 9.94 988 | | 60 | |
| 1 | 9.65 729 | 24 | 9.70 748 | 31 | 0.29 252 | 9.94 982 | 6 | 59 | " 32 31 30 |
| 2 | 9.65 754 | 25 | 9.70 779 | 31 | 0.29 221 | 9.94 975 | 7 | 58 | 1 0.5 0.5 0.5 |
| 3 | 9.65 779 | 25 | 9.70 810 | 31 | 0.29 190 | 9.94 969 | 7 | 57 | 2 1.1 1.0 1.0 |
| 4 | 9.65 804 | 25 | 9.70 841 | 31 | 0.29 159 | 9.94 962 | 7 | 56 | 3 1.6 1.6 1.5 |
| 5 | 9.65 828 | 24 | 9.70 873 | 32 | 0.29 127 | 9.94 956 | 6 | 55 | 4 2.1 2.1 2.0 |
| 6 | 9.65 853 | 25 | 9.70 904 | 31 | 0.29 096 | 9.94 949 | 7 | 54 | 5 2.7 2.6 2.5 |
| 7 | 9.65 878 | 25 | 9.70 935 | 31 | 0.29 065 | 9.94 943 | 6 | 53 | 6 3.2 3.1 3.0 |
| 8 | 9.65 902 | 24 | 9.70 966 | 31 | 0.29 034 | 9.94 936 | 7 | 52 | 7 3.7 3.6 3.5 |
| 9 | 9.65 927 | 25 | 9.70 997 | 31 | 0.29 003 | 9.94 930 | 6 | 51 | 8 4.3 4.1 4.0 |
| 10 | 9.65 952 | 25 | 9.71 028 | 31 | 0.28 972 | 9.94 923 | 7 | 50 | 9 4.8 4.6 4.5 |
| 11 | 9.65 976 | 24 | 9.71 059 | 31 | 0.28 941 | 9.94 917 | 6 | 49 | 10 5.3 5.2 5.0 |
| 12 | 9.66 001 | 25 | 9.71 090 | 31 | 0.28 910 | 9.94 911 | 6 | 48 | 20 10.7 10.3 10.0 |
| 13 | 9.66 025 | 24 | 9.71 121 | 31 | 0.28 879 | 9.94 904 | 7 | 47 | 30 16.0 15.5 15.0 |
| 14 | 9.66 050 | 25 | 9.71 153 | 32 | 0.28 847 | 9.94 898 | 6 | 46 | 40 21.3 20.7 20.0 |
| 15 | 9.66 075 | 25 | 9.71 184 | 31 | 0.28 816 | 9.94 891 | 7 | 45 | 50 26.7 25.8 25.0 |
| 16 | 9.66 099 | 24 | 9.71 215 | 31 | 0.28 785 | 9.94 885 | 6 | 44 | |
| 17 | 9.66 124 | 25 | 9.71 246 | 31 | 0.28 754 | 9.94 878 | 7 | 43 | " 25 24 23 |
| 18 | 9.66 148 | 24 | 9.71 277 | 31 | 0.28 723 | 9.94 871 | 7 | 42 | 1 0.4 0.4 0.4 |
| 19 | 9.66 173 | 25 | 9.71 308 | 31 | 0.28 692 | 9.94 865 | 6 | 41 | 2 0.8 0.8 0.8 |
| 20 | 9.66 197 | 24 | 9.71 339 | 31 | 0.28 661 | 9.94 858 | 7 | 40 | 3 1.2 1.2 1.2 |
| 21 | 9.66 221 | 24 | 9.71 370 | 31 | 0.28 630 | 9.94 852 | 6 | 39 | 4 1.7 1.6 1.6 |
| 22 | 9.66 246 | 25 | 9.71 401 | 31 | 0.28 599 | 9.94 845 | 7 | 38 | 5 2.1 2.0 1.9 |
| 23 | 9.66 270 | 24 | 9.71 431 | 30 | 0.28 569 | 9.94 839 | 6 | 37 | 6 2.5 2.4 2.3 |
| 24 | 9.66 295 | 25 | 9.71 462 | 31 | 0.28 538 | 9.94 832 | 7 | 36 | 7 2.9 2.8 2.7 |
| 25 | 9.66 319 | 24 | 9.71 493 | 31 | 0.28 507 | 9.94 826 | 6 | 35 | 8 3.3 3.2 3.1 |
| 26 | 9.66 343 | 24 | 9.71 524 | 31 | 0.28 476 | 9.94 819 | 7 | 34 | 9 3.8 3.6 3.4 |
| 27 | 9.66 368 | 25 | 9.71 555 | 31 | 0.28 445 | 9.94 813 | 6 | 33 | 10 4.2 4.0 3.8 |
| 28 | 9.66 392 | 24 | 9.71 586 | 31 | 0.28 414 | 9.94 806 | 7 | 32 | 20 8.3 8.0 7.7 |
| 29 | 9.66 416 | 25 | 9.71 617 | 31 | 0.28 383 | 9.94 799 | 6 | 31 | 30 12.5 12.0 11.5 |
| 30 | 9.66 441 | 24 | 9.71 648 | 31 | 0.28 352 | 9.94 793 | 7 | 30 | 40 16.7 16.0 15.3 |
| 31 | 9.66 465 | 24 | 9.71 679 | 31 | 0.28 321 | 9.94 786 | 6 | 29 | 50 20.8 20.0 19.2 |
| 32 | 9.66 489 | 24 | 9.71 709 | 30 | 0.28 291 | 9.94 780 | 6 | 28 | |
| 33 | 9.66 513 | 24 | 9.71 740 | 31 | 0.28 260 | 9.94 773 | 7 | 27 | " 7 6 |
| 34 | 9.66 537 | 25 | 9.71 771 | 31 | 0.28 229 | 9.94 767 | 6 | 26 | 1 0.1 0.1 |
| 35 | 9.66 562 | 24 | 9.71 802 | 31 | 0.28 198 | 9.94 760 | 7 | 25 | 2 0.2 0.2 |
| 36 | 9.66 586 | 24 | 9.71 833 | 31 | 0.28 167 | 9.94 753 | 6 | 24 | 3 0.4 0.3 |
| 37 | 9.66 610 | 24 | 9.71 863 | 30 | 0.28 137 | 9.94 747 | 7 | 23 | 4 0.5 0.4 |
| 38 | 9.66 634 | 24 | 9.71 894 | 31 | 0.28 106 | 9.94 740 | 6 | 22 | 5 0.6 0.5 |
| 39 | 9.66 658 | 24 | 9.71 925 | 31 | 0.28 075 | 9.94 734 | 7 | 21 | 6 0.7 0.6 |
| 40 | 9.66 682 | 24 | 9.71 955 | 30 | 0.28 045 | 9.94 727 | 6 | 20 | 7 0.8 0.7 |
| 41 | 9.66 706 | 24 | 9.71 986 | 31 | 0.28 014 | 9.94 720 | 7 | 19 | 8 0.9 0.8 |
| 42 | 9.66 731 | 25 | 9.72 017 | 31 | 0.27 983 | 9.94 714 | 6 | 18 | 9 1.0 0.9 |
| 43 | 9.66 755 | 24 | 9.72 048 | 31 | 0.27 952 | 9.94 707 | 7 | 17 | 10 1.2 1.0 |
| 44 | 9.66 779 | 24 | 9.72 078 | 30 | 0.27 922 | 9.94 700 | 6 | 16 | 20 2.3 2.0 |
| 45 | 9.66 803 | 24 | 9.72 109 | 31 | 0.27 891 | 9.94 694 | 7 | 15 | 30 3.5 3.0 |
| 46 | 9.66 827 | 24 | 9.72 140 | 31 | 0.27 860 | 9.94 687 | 6 | 14 | 40 4.7 4.0 |
| 47 | 9.66 851 | 24 | 9.72 170 | 30 | 0.27 830 | 9.94 680 | 7 | 13 | 50 5.8 5.0 |
| 48 | 9.66 875 | 24 | 9.72 201 | 31 | 0.27 799 | 9.94 674 | 6 | 12 | |
| 49 | 9.66 899 | 23 | 9.72 231 | 31 | 0.27 769 | 9.94 667 | 7 | 11 | |
| 50 | 9.66 922 | 24 | 9.72 262 | 31 | 0.27 738 | 9.94 660 | 6 | 10 | 7 5 5 |
| 51 | 9.66 946 | 24 | 9.72 293 | 30 | 0.27 707 | 9.94 654 | 7 | 9 | 30 31 30 |
| 52 | 9.66 970 | 24 | 9.72 323 | 31 | 0.27 677 | 9.94 647 | 6 | 8 | |
| 53 | 9.66 994 | 24 | 9.72 354 | 31 | 0.27 646 | 9.94 640 | 7 | 7 | 0 2.1 2.6 2.5 |
| 54 | 9.67 018 | 24 | 9.72 384 | 30 | 0.27 616 | 9.94 634 | 6 | 6 | 1 6.4 7.8 7.5 |
| 55 | 9.67 042 | 24 | 9.72 415 | 31 | 0.27 585 | 9.94 627 | 7 | 5 | 2 10.7 12.9 12.5 |
| 56 | 9.67 066 | 24 | 9.72 445 | 30 | 0.27 555 | 9.94 620 | 6 | 4 | 3 15.0 18.1 17.5 |
| 57 | 9.67 090 | 23 | 9.72 476 | 31 | 0.27 524 | 9.94 614 | 7 | 3 | 4 19.3 23.2 22.5 |
| 58 | 9.67 113 | 24 | 9.72 506 | 30 | 0.27 494 | 9.94 607 | 6 | 2 | 5 23.6 28.4 27.5 |
| 59 | 9.67 137 | 24 | 9.72 537 | 31 | 0.27 463 | 9.94 600 | 7 | 1 | 6 27.9 — — |
| 60 | 9.67 161 | 24 | 9.72 567 | 30 | 0.27 433 | 9.94 593 | 6 | 0 | 7 |
| | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | | P.P. |

117° (297°)

(242°) 62°

LOGARITHMS OF THE FUNCTIONS (Continued)

28° (208°)

(331°) 151°

| | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | | P. P. | | | |
|----|----------|----|----------|------|----------|----------|----|----|-------|------|------|------|
| 0 | 9.67 161 | | 9.72 567 | | 0.27 433 | 9.94 593 | | 60 | | | | |
| 1 | 9.67 185 | 24 | 9.72 598 | 31 | 0.27 402 | 9.94 587 | 6 | 59 | " | 31 | 30 | 29 |
| 2 | 9.67 208 | 23 | 9.72 628 | 30 | 0.27 372 | 9.94 580 | 7 | 58 | 1 | 0.5 | 0.5 | 0.5 |
| 3 | 9.67 232 | 24 | 9.72 659 | 31 | 0.27 341 | 9.94 573 | 7 | 57 | 2 | 1.0 | 1.0 | 1.0 |
| 4 | 9.67 256 | 24 | 9.72 689 | 30 | 0.27 311 | 9.94 567 | 6 | 56 | 3 | 1.6 | 1.5 | 1.4 |
| 5 | 9.67 280 | 24 | 9.72 720 | 31 | | | 7 | 55 | 4 | 2.1 | 2.0 | 1.9 |
| 6 | 9.67 303 | 23 | 9.72 750 | 30 | 0.27 280 | 9.94 560 | 7 | 54 | 5 | 2.6 | 2.5 | 2.4 |
| 7 | 9.67 327 | 24 | 9.72 780 | 30 | 0.27 250 | 9.94 553 | 7 | 53 | 6 | 3.1 | 3.0 | 2.9 |
| 8 | 9.67 350 | 23 | 9.72 811 | 31 | 0.27 220 | 9.94 546 | 6 | 52 | 7 | 3.6 | 3.5 | 3.4 |
| 9 | 9.67 374 | 24 | 9.72 841 | 30 | 0.27 189 | 9.94 540 | 7 | 51 | 8 | 4.1 | 4.0 | 3.9 |
| 10 | 9.67 398 | 24 | 9.72 872 | 31 | 0.27 159 | 9.94 533 | 7 | 50 | 9 | 4.6 | 4.5 | 4.4 |
| 11 | 9.67 421 | 23 | 9.72 902 | 30 | 0.27 128 | 9.94 526 | 7 | 49 | 10 | 5.2 | 5.0 | 4.8 |
| 12 | 9.67 445 | 24 | 9.72 932 | 30 | 0.27 098 | 9.94 519 | 6 | 48 | 20 | 10.3 | 10.0 | 9.7 |
| 13 | 9.67 468 | 23 | 9.72 963 | 31 | 0.27 068 | 9.94 513 | 7 | 47 | 30 | 15.5 | 15.0 | 14.5 |
| 14 | 9.67 492 | 24 | 9.72 993 | 30 | 0.27 037 | 9.94 506 | 7 | 46 | 40 | 20.7 | 20.0 | 19.3 |
| 15 | 9.67 515 | 23 | 9.73 023 | 30 | 0.27 007 | 9.94 499 | 7 | 45 | 50 | 25.8 | 25.0 | 24.2 |
| 16 | 9.67 539 | 24 | 9.73 054 | 31 | 0.26 977 | 9.94 492 | 7 | 44 | | | | |
| 17 | 9.67 562 | 23 | 9.73 084 | 30 | 0.26 946 | 9.94 485 | 6 | 43 | " | 24 | 23 | 22 |
| 18 | 9.67 586 | 24 | 9.73 114 | 30 | 0.26 916 | 9.94 479 | 7 | 42 | 1 | 0.4 | 0.4 | 0.4 |
| 19 | 9.67 609 | 23 | 9.73 144 | 30 | 0.26 886 | 9.94 472 | 7 | 41 | 2 | 0.8 | 0.8 | 0.7 |
| 20 | 9.67 633 | 24 | 9.73 175 | 31 | 0.26 856 | 9.94 465 | 7 | 40 | 3 | 1.2 | 1.2 | 1.1 |
| 21 | 9.67 656 | 23 | 9.73 205 | 30 | 0.26 825 | 9.94 458 | 7 | 39 | 4 | 1.6 | 1.5 | 1.5 |
| 22 | 9.67 680 | 24 | 9.73 236 | 30 | 0.26 795 | 9.94 451 | 6 | 38 | 5 | 2.0 | 1.9 | 1.8 |
| 23 | 9.67 703 | 23 | 9.73 266 | 30 | 0.26 765 | 9.94 445 | 7 | 37 | 6 | 2.4 | 2.3 | 2.2 |
| 24 | 9.67 726 | 24 | 9.73 296 | 30 | 0.26 735 | 9.94 438 | 7 | 36 | 7 | 2.8 | 2.7 | 2.6 |
| 25 | 9.67 750 | 24 | 9.73 326 | 31 | 0.26 705 | 9.94 431 | 7 | 35 | 8 | 3.2 | 3.1 | 2.9 |
| 26 | 9.67 773 | 23 | 9.73 356 | 30 | C.26 674 | 9.94 424 | 7 | 34 | 9 | 3.6 | 3.4 | 3.3 |
| 27 | 9.67 796 | 24 | 9.73 386 | 30 | 0.26 644 | 9.94 417 | 7 | 33 | 10 | 4.0 | 3.8 | 3.7 |
| 28 | 9.67 820 | 23 | 9.73 416 | 30 | 0.26 614 | 9.94 410 | 6 | 32 | 20 | 8.0 | 7.7 | 7.3 |
| 29 | 9.67 843 | 23 | 9.73 446 | 30 | 0.26 584 | 9.94 404 | 7 | 31 | 30 | 12.0 | 11.5 | 11.0 |
| 30 | 9.67 866 | 23 | 9.73 476 | 30 | 0.26 554 | 9.94 397 | 7 | 30 | 40 | 16.0 | 15.3 | 14.7 |
| 31 | 9.67 890 | 24 | 9.73 507 | 31 | 0.26 524 | 9.94 390 | 7 | 29 | 50 | 20.0 | 19.2 | 18.3 |
| 32 | 9.67 913 | 23 | 9.73 537 | 30 | 0.26 493 | 9.94 383 | 7 | 28 | | | | |
| 33 | 9.67 936 | 23 | 9.73 567 | 30 | 0.26 463 | 9.94 376 | 7 | 27 | " | 7 | 6 | |
| 34 | 9.67 959 | 23 | 9.73 597 | 30 | 0.26 433 | 9.94 369 | 7 | 26 | 1 | 0.1 | 0.1 | |
| 35 | 9.67 982 | 23 | 9.73 627 | 30 | 0.26 403 | 9.94 362 | 7 | 25 | 2 | 0.2 | 0.2 | |
| 36 | 9.68 006 | 24 | 9.73 657 | 30 | 0.26 373 | 9.94 355 | 7 | 24 | 3 | 0.4 | 0.3 | |
| 37 | 9.68 029 | 23 | 9.73 687 | 30 | 0.26 343 | 9.94 349 | 6 | 23 | 4 | 0.5 | 0.4 | |
| 38 | 9.68 052 | 23 | 9.73 717 | 30 | 0.26 313 | 9.94 342 | 7 | 22 | 5 | 0.6 | 0.5 | |
| 39 | 9.68 075 | 23 | 9.73 747 | 30 | 0.26 283 | 9.94 335 | 7 | 21 | 6 | 0.7 | 0.6 | |
| 40 | 9.68 098 | 23 | 9.73 777 | 30 | 0.26 253 | 9.94 328 | 7 | 20 | 7 | 0.8 | 0.7 | |
| 41 | 9.68 121 | 23 | 9.73 807 | 30 | 0.26 223 | 9.94 321 | 7 | 19 | 8 | 0.9 | 0.8 | |
| 42 | 9.68 144 | 23 | 9.73 837 | 30 | 0.26 193 | 9.94 314 | 7 | 18 | 9 | 1.0 | 0.9 | |
| 43 | 9.68 167 | 23 | 9.73 867 | 30 | 0.26 163 | 9.94 307 | 7 | 17 | 10 | 1.2 | 1.0 | |
| 44 | 9.68 190 | 23 | 9.73 897 | 30 | 0.26 133 | 9.94 300 | 7 | 16 | 20 | 2.3 | 2.0 | |
| 45 | 9.68 213 | 23 | 9.73 927 | 30 | 0.26 103 | 9.94 293 | 7 | 15 | 30 | 3.5 | 3.0 | |
| 46 | 9.68 237 | 24 | 9.73 957 | 30 | 0.26 073 | 9.94 286 | 7 | 14 | 40 | 4.7 | 4.0 | |
| 47 | 9.68 260 | 23 | 9.73 987 | 30 | 0.26 043 | 9.94 279 | 6 | 13 | 50 | 5.8 | 5.0 | |
| 48 | 9.68 283 | 23 | 9.74 017 | 30 | 0.26 013 | 9.94 273 | 7 | 12 | | | | |
| 49 | 9.68 305 | 22 | 9.74 047 | 30 | 0.25 983 | 9.94 266 | 7 | 11 | | | | |
| 50 | 9.68 328 | 23 | 9.74 077 | 30 | 0.25 953 | 9.94 259 | 7 | 10 | | | | |
| 51 | 9.68 351 | 23 | 9.74 107 | 30 | 0.25 923 | 9.94 252 | 7 | 9 | | 7 | 6 | |
| 52 | 9.68 374 | 23 | 9.74 137 | 30 | 0.25 893 | 9.94 245 | 7 | 8 | | 31 | 31 | 30 |
| 53 | 9.68 397 | 23 | 9.74 166 | 29 | 0.25 863 | 9.94 238 | 7 | 7 | 0 | 2.2 | 2.6 | 2.5 |
| 54 | 9.68 420 | 23 | 9.74 196 | 30 | 0.25 834 | 9.94 231 | 7 | 6 | 1 | 6.6 | 7.8 | 7.5 |
| 55 | 9.68 443 | 23 | 9.74 226 | 30 | 0.25 804 | 9.94 224 | 7 | 5 | 2 | 11.1 | 12.9 | 12.5 |
| 56 | 9.68 466 | 23 | 9.74 256 | 30 | 0.25 774 | 9.94 217 | 7 | 4 | 3 | 15.5 | 18.1 | 17.5 |
| 57 | 9.68 489 | 23 | 9.74 286 | 30 | 0.25 744 | 9.94 210 | 7 | 3 | 4 | 19.9 | 23.2 | 22.5 |
| 58 | 9.68 512 | 23 | 9.74 316 | 30 | 0.25 714 | 9.94 203 | 7 | 2 | 5 | 24.4 | 28.4 | 27.5 |
| 59 | 9.68 534 | 22 | 9.74 346 | 29 | 0.25 684 | 9.94 196 | 7 | 1 | 6 | 28.8 | — | — |
| 60 | 9.68 557 | 23 | 9.74 376 | 30 | 0.25 655 | 9.94 189 | 7 | 0 | 7 | | | |
| | | | | | 0.25 625 | 9.94 182 | | | | | | |
| ' | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | ' | P. P. | | | |

118° (298°)

(241°) 61°

LOGARITHMS OF THE FUNCTIONS (Continued)

29° (209°)

(330°) 150°

| | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | | P. P. | | | |
|----|----------|----|----------|------|----------|----------|----|----|-------|------|------|------|
| 0 | 9.68 557 | | 9.74 375 | | 0.25 625 | 9.94 182 | | 60 | | | | |
| 1 | 9.68 580 | 23 | 9.74 405 | 30 | 0.25 595 | 9.94 175 | 7 | 59 | | | | |
| 2 | 9.68 603 | 23 | 9.74 435 | 30 | 0.25 565 | 9.94 168 | 7 | 58 | " | 30 | 29 | 23 |
| 3 | 9.68 625 | 22 | 9.74 465 | 30 | 0.25 535 | 9.94 161 | 7 | 57 | 1 | 0.5 | 0.5 | 0.4 |
| 4 | 9.68 648 | 23 | 9.74 494 | 29 | 0.25 506 | 9.94 154 | 7 | 56 | 2 | 1.0 | 1.0 | 0.8 |
| 5 | 9.68 671 | 23 | 9.74 524 | 30 | 0.25 476 | 9.94 147 | 7 | 55 | 3 | 1.5 | 1.4 | 1.2 |
| 6 | 9.68 694 | 23 | 9.74 554 | 30 | 0.25 446 | 9.94 140 | 7 | 54 | 4 | 2.0 | 1.9 | 1.6 |
| 7 | 9.68 716 | 22 | 9.74 583 | 29 | 0.25 417 | 9.94 133 | 7 | 53 | 5 | 2.5 | 2.4 | 1.9 |
| 8 | 9.68 739 | 23 | 9.74 613 | 30 | 0.25 387 | 9.94 126 | 7 | 52 | 6 | 3.0 | 2.9 | 2.3 |
| 9 | 9.68 762 | 23 | 9.74 643 | 30 | 0.25 357 | 9.94 119 | 7 | 51 | 7 | 3.5 | 3.4 | 2.7 |
| 10 | 9.68 784 | 22 | 9.74 673 | 30 | 0.25 327 | 9.94 112 | 7 | 50 | 8 | 4.0 | 3.9 | 3.1 |
| 11 | 9.68 807 | 23 | 9.74 702 | 29 | 0.25 298 | 9.94 105 | 7 | 49 | 9 | 4.5 | 4.4 | 3.4 |
| 12 | 9.68 829 | 22 | 9.74 732 | 30 | 0.25 268 | 9.94 098 | 7 | 48 | 10 | 5.0 | 4.8 | 3.8 |
| 13 | 9.68 852 | 23 | 9.74 762 | 30 | 0.25 238 | 9.94 090 | 8 | 47 | 20 | 10.0 | 9.7 | 7.7 |
| 14 | 9.68 875 | 23 | 9.74 791 | 29 | 0.25 209 | 9.94 083 | 7 | 46 | 30 | 15.0 | 14.5 | 11.5 |
| 15 | 9.68 897 | 22 | 9.74 821 | 30 | 0.25 179 | 9.94 076 | 7 | 45 | 40 | 20.0 | 19.3 | 15.3 |
| 16 | 9.68 920 | 23 | 9.74 851 | 30 | 0.25 149 | 9.94 069 | 7 | 44 | 50 | 25.0 | 24.2 | 19.2 |
| 17 | 9.68 942 | 22 | 9.74 880 | 29 | 0.25 120 | 9.94 062 | 7 | 43 | | | | |
| 18 | 9.68 965 | 23 | 9.74 910 | 30 | 0.25 090 | 9.94 055 | 7 | 42 | " | 22 | 8 | 7 |
| 19 | 9.68 987 | 22 | 9.74 939 | 29 | 0.25 061 | 9.94 048 | 7 | 41 | 1 | 0.4 | 0.1 | 0.1 |
| 20 | 9.69 010 | 23 | 9.74 969 | 30 | 0.25 031 | 9.94 041 | 7 | 40 | 2 | 0.7 | 0.3 | 0.2 |
| 21 | 9.69 032 | 22 | 9.74 998 | 29 | 0.25 002 | 9.94 034 | 7 | 39 | 3 | 1.1 | 0.4 | 0.4 |
| 22 | 9.69 055 | 23 | 9.75 028 | 30 | 0.24 972 | 9.94 027 | 7 | 38 | 4 | 1.5 | 0.5 | 0.5 |
| 23 | 9.69 077 | 22 | 9.75 058 | 30 | 0.24 942 | 9.94 020 | 7 | 37 | 5 | 1.8 | 0.7 | 0.6 |
| 24 | 9.69 100 | 23 | 9.75 087 | 29 | 0.24 913 | 9.94 012 | 8 | 36 | 6 | 2.2 | 0.8 | 0.7 |
| 25 | 9.69 122 | 22 | 9.75 117 | 30 | 0.24 883 | 9.94 005 | 7 | 35 | 7 | 2.6 | 0.9 | 0.8 |
| 26 | 9.69 144 | 23 | 9.75 146 | 29 | 0.24 854 | 9.93 998 | 7 | 34 | 8 | 2.9 | 1.1 | 0.9 |
| 27 | 9.69 167 | 22 | 9.75 176 | 30 | 0.24 824 | 9.93 991 | 7 | 33 | 9 | 3.3 | 1.2 | 1.0 |
| 28 | 9.69 189 | 23 | 9.75 205 | 29 | 0.24 795 | 9.93 984 | 7 | 32 | 10 | 3.7 | 1.3 | 1.2 |
| 29 | 9.69 212 | 22 | 9.75 235 | 30 | 0.24 765 | 9.93 977 | 7 | 31 | 20 | 7.3 | 2.7 | 2.3 |
| 30 | 9.69 234 | 23 | 9.75 264 | 29 | 0.24 736 | 9.93 970 | 7 | 30 | 30 | 11.0 | 4.0 | 3.5 |
| 31 | 9.69 256 | 22 | 9.75 294 | 30 | 0.24 706 | 9.93 963 | 7 | 29 | 40 | 14.7 | 5.3 | 4.7 |
| 32 | 9.69 279 | 23 | 9.75 323 | 29 | 0.24 677 | 9.93 956 | 8 | 28 | 50 | 18.3 | 6.7 | 5.8 |
| 33 | 9.69 301 | 22 | 9.75 353 | 30 | 0.24 647 | 9.93 948 | 7 | 27 | | | | |
| 34 | 9.69 323 | 23 | 9.75 382 | 29 | 0.24 618 | 9.93 941 | 7 | 26 | | | | |
| 35 | 9.69 345 | 22 | 9.75 411 | 30 | 0.24 589 | 9.93 934 | 7 | 25 | | | | |
| 36 | 9.69 368 | 23 | 9.75 441 | 29 | 0.24 559 | 9.93 927 | 7 | 24 | | | | |
| 37 | 9.69 390 | 22 | 9.75 470 | 30 | 0.24 530 | 9.93 920 | 7 | 23 | | | | |
| 38 | 9.69 412 | 23 | 9.75 500 | 29 | 0.24 500 | 9.93 912 | 8 | 22 | | | | |
| 39 | 9.69 434 | 22 | 9.75 529 | 30 | 0.24 471 | 9.93 905 | 7 | 21 | | | | |
| 40 | 9.69 456 | 23 | 9.75 558 | 29 | 0.24 442 | 9.93 898 | 7 | 20 | | | | |
| 41 | 9.69 479 | 22 | 9.75 588 | 30 | 0.24 412 | 9.93 891 | 7 | 19 | | | | |
| 42 | 9.69 501 | 23 | 9.75 617 | 29 | 0.24 383 | 9.93 884 | 7 | 18 | | | | |
| 43 | 9.69 523 | 22 | 9.75 647 | 30 | 0.24 353 | 9.93 876 | 8 | 17 | | | | |
| 44 | 9.69 545 | 23 | 9.75 676 | 29 | 0.24 324 | 9.93 869 | 7 | 16 | | | | |
| 45 | 9.69 567 | 22 | 9.75 705 | 30 | 0.24 295 | 9.93 862 | 7 | 15 | | | | |
| 46 | 9.69 589 | 23 | 9.75 735 | 29 | 0.24 265 | 9.93 855 | 7 | 14 | | | | |
| 47 | 9.69 611 | 22 | 9.75 764 | 30 | 0.24 236 | 9.93 847 | 8 | 13 | | | | |
| 48 | 9.69 633 | 23 | 9.75 793 | 29 | 0.24 207 | 9.93 840 | 7 | 12 | | | | |
| 49 | 9.69 655 | 22 | 9.75 822 | 30 | 0.24 178 | 9.93 833 | 7 | 11 | | | | |
| 50 | 9.69 677 | 23 | 9.75 852 | 29 | 0.24 148 | 9.93 826 | 7 | 10 | | | | |
| 51 | 9.69 699 | 22 | 9.75 881 | 30 | 0.24 119 | 9.93 819 | 7 | 9 | | | | |
| 52 | 9.69 721 | 23 | 9.75 910 | 29 | 0.24 090 | 9.93 811 | 8 | 8 | | | | |
| 53 | 9.69 743 | 22 | 9.75 939 | 30 | 0.24 061 | 9.93 804 | 7 | 7 | | | | |
| 54 | 9.69 765 | 23 | 9.75 969 | 29 | 0.24 031 | 9.93 797 | 7 | 6 | | | | |
| 55 | 9.69 787 | 22 | 9.75 998 | 30 | 0.24 002 | 9.93 789 | 8 | 5 | | | | |
| 56 | 9.69 809 | 23 | 9.76 027 | 29 | 0.23 973 | 9.93 782 | 7 | 4 | | | | |
| 57 | 9.69 831 | 22 | 9.76 056 | 30 | 0.23 944 | 9.93 775 | 7 | 3 | | | | |
| 58 | 9.69 853 | 23 | 9.76 086 | 29 | 0.23 914 | 9.93 768 | 7 | 2 | | | | |
| 59 | 9.69 875 | 22 | 9.76 115 | 30 | 0.23 885 | 9.93 760 | 8 | 1 | | | | |
| 60 | 9.69 897 | 23 | 9.76 144 | 29 | 0.23 856 | 9.93 753 | 7 | 0 | | | | |
| ' | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | ' | P. P. | | | |

119° (299°)

(240°) 60°

LOGARITHMS OF THE FUNCTIONS (Continued)

30° (210°)

(329°) 149°

| ' | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | ' | P.P. | | |
|----|----------|----|----------|------|----------|----------|----|----|------|------|------|
| 0 | 9.69 897 | | 9.76 144 | | 0.23 856 | 9.93 753 | | 60 | | | |
| 1 | 9.69 919 | 22 | 9.76 173 | 29 | 0.23 827 | 9.93 746 | 7 | 59 | " | 30 | 29 |
| 2 | 9.69 941 | 22 | 9.76 202 | 29 | 0.23 798 | 9.93 738 | 8 | 58 | 1 | 0.5 | 0.5 |
| 3 | 9.69 963 | 22 | 9.76 231 | 29 | 0.23 769 | 9.93 731 | 7 | 57 | 2 | 1.0 | 1.0 |
| 4 | 9.69 984 | 21 | 9.76 261 | 30 | 0.23 739 | 9.93 724 | 7 | 56 | 3 | 1.5 | 1.4 |
| 5 | 9.70 006 | 22 | 9.76 290 | 29 | 0.23 710 | 9.93 717 | 7 | 55 | 4 | 2.0 | 1.9 |
| 6 | 9.70 028 | 22 | 9.76 319 | 29 | 0.23 681 | 9.93 709 | 8 | 54 | 5 | 2.5 | 2.4 |
| 7 | 9.70 050 | 22 | 9.76 348 | 29 | 0.23 652 | 9.93 702 | 7 | 53 | 6 | 3.0 | 2.9 |
| 8 | 9.70 072 | 22 | 9.76 377 | 29 | 0.23 623 | 9.93 695 | 7 | 52 | 7 | 3.5 | 3.4 |
| 9 | 9.70 093 | 21 | 9.76 406 | 29 | 0.23 594 | 9.93 687 | 7 | 51 | 8 | 4.0 | 3.9 |
| 10 | 9.70 115 | 22 | 9.76 435 | 29 | 0.23 565 | 9.93 680 | 7 | 50 | 9 | 4.5 | 4.4 |
| 11 | 9.70 137 | 22 | 9.76 464 | 29 | 0.23 536 | 9.93 673 | 7 | 49 | 10 | 5.0 | 4.8 |
| 12 | 9.70 159 | 22 | 9.76 493 | 29 | 0.23 507 | 9.93 665 | 8 | 48 | 20 | 10.0 | 9.7 |
| 13 | 9.70 180 | 21 | 9.76 522 | 29 | 0.23 478 | 9.93 658 | 7 | 47 | 30 | 15.0 | 14.5 |
| 14 | 9.70 202 | 22 | 9.76 551 | 29 | 0.23 449 | 9.93 650 | 7 | 46 | 40 | 20.0 | 19.3 |
| 15 | 9.70 224 | 21 | 9.76 580 | 29 | 0.23 420 | 9.93 643 | 7 | 45 | 50 | 25.0 | 24.2 |
| 16 | 9.70 245 | 21 | 9.76 609 | 29 | 0.23 391 | 9.93 636 | 7 | 44 | | | 23.3 |
| 17 | 9.70 267 | 22 | 9.76 639 | 30 | 0.23 361 | 9.93 628 | 8 | 43 | " | 22 | 21 |
| 18 | 9.70 288 | 21 | 9.76 668 | 29 | 0.23 332 | 9.93 621 | 7 | 42 | 1 | 0.4 | 0.4 |
| 19 | 9.70 310 | 22 | 9.76 697 | 28 | 0.23 303 | 9.93 614 | 8 | 41 | 2 | 0.7 | 0.7 |
| 20 | 9.70 332 | 21 | 9.76 726 | 29 | 0.23 275 | 9.93 606 | 7 | 40 | 3 | 1.1 | 1.0 |
| 21 | 9.70 353 | 22 | 9.76 754 | 29 | 0.23 246 | 9.93 599 | 8 | 39 | 4 | 1.5 | 1.4 |
| 22 | 9.70 375 | 22 | 9.76 783 | 29 | 0.23 217 | 9.93 591 | 7 | 38 | 5 | 1.8 | 1.8 |
| 23 | 9.70 396 | 21 | 9.76 812 | 29 | 0.23 188 | 9.93 584 | 7 | 37 | 6 | 2.2 | 2.1 |
| 24 | 9.70 418 | 22 | 9.76 841 | 29 | 0.23 159 | 9.93 577 | 7 | 36 | 7 | 2.6 | 2.4 |
| 25 | 9.70 439 | 21 | 9.76 870 | 29 | 0.23 130 | 9.93 569 | 8 | 35 | 8 | 2.9 | 2.8 |
| 26 | 9.70 461 | 22 | 9.76 899 | 29 | 0.23 101 | 9.93 562 | 7 | 34 | 9 | 3.3 | 3.2 |
| 27 | 9.70 482 | 21 | 9.76 928 | 29 | 0.23 072 | 9.93 554 | 8 | 33 | 10 | 3.7 | 3.5 |
| 28 | 9.70 504 | 22 | 9.76 957 | 29 | 0.23 043 | 9.93 547 | 7 | 32 | 20 | 7.3 | 7.0 |
| 29 | 9.70 525 | 21 | 9.76 986 | 29 | 0.23 014 | 9.93 539 | 8 | 31 | 30 | 11.0 | 10.5 |
| 30 | 9.70 547 | 22 | 9.77 015 | 29 | 0.22 985 | 9.93 532 | 7 | 30 | 40 | 14.7 | 14.0 |
| 31 | 9.70 568 | 21 | 9.77 044 | 29 | 0.22 956 | 9.93 525 | 7 | 29 | 50 | 18.3 | 17.5 |
| 32 | 9.70 590 | 22 | 9.77 073 | 29 | 0.22 927 | 9.93 517 | 8 | 28 | " | 8 | 7 |
| 33 | 9.70 611 | 21 | 9.77 101 | 28 | 0.22 899 | 9.93 510 | 7 | 27 | 1 | 0.1 | 0.1 |
| 34 | 9.70 633 | 22 | 9.77 130 | 29 | 0.22 870 | 9.93 502 | 8 | 26 | 2 | 0.3 | 0.2 |
| 35 | 9.70 654 | 21 | 9.77 159 | 29 | 0.22 841 | 9.93 495 | 7 | 25 | 3 | 0.4 | 0.4 |
| 36 | 9.70 675 | 22 | 9.77 188 | 29 | 0.22 812 | 9.93 487 | 8 | 24 | 4 | 0.5 | 0.5 |
| 37 | 9.70 697 | 21 | 9.77 217 | 29 | 0.22 783 | 9.93 480 | 7 | 23 | 5 | 0.7 | 0.6 |
| 38 | 9.70 718 | 22 | 9.77 246 | 28 | 0.22 754 | 9.93 472 | 8 | 22 | 6 | 0.8 | 0.7 |
| 39 | 9.70 739 | 21 | 9.77 274 | 29 | 0.22 726 | 9.93 465 | 7 | 21 | 7 | 0.9 | 0.8 |
| 40 | 9.70 761 | 22 | 9.77 303 | 29 | 0.22 697 | 9.93 457 | 8 | 20 | 8 | 1.1 | 0.9 |
| 41 | 9.70 782 | 21 | 9.77 332 | 29 | 0.22 668 | 9.93 450 | 7 | 19 | 9 | 1.2 | 1.0 |
| 42 | 9.70 803 | 22 | 9.77 361 | 29 | 0.22 639 | 9.93 442 | 8 | 18 | 10 | 1.3 | 1.2 |
| 43 | 9.70 824 | 21 | 9.77 390 | 29 | 0.22 610 | 9.93 435 | 7 | 17 | 20 | 2.7 | 2.3 |
| 44 | 9.70 846 | 22 | 9.77 418 | 28 | 0.22 582 | 9.93 427 | 8 | 16 | 30 | 4.0 | 3.5 |
| 45 | 9.70 867 | 21 | 9.77 447 | 29 | 0.22 553 | 9.93 420 | 7 | 15 | 40 | 5.3 | 4.7 |
| 46 | 9.70 888 | 22 | 9.77 476 | 29 | 0.22 524 | 9.93 412 | 8 | 14 | 50 | 6.7 | 5.8 |
| 47 | 9.70 909 | 21 | 9.77 505 | 29 | 0.22 495 | 9.93 405 | 7 | 13 | | | |
| 48 | 9.70 931 | 22 | 9.77 533 | 28 | 0.22 467 | 9.93 397 | 8 | 12 | | | |
| 49 | 9.70 952 | 21 | 9.77 562 | 29 | 0.22 438 | 9.93 390 | 7 | 11 | | | |
| 50 | 9.70 973 | 22 | 9.77 591 | 29 | 0.22 409 | 9.93 382 | 8 | 10 | 7 | 7 | 7 |
| 51 | 9.70 994 | 21 | 9.77 619 | 28 | 0.22 381 | 9.93 375 | 7 | 9 | 0 | 30 | 29 |
| 52 | 9.71 015 | 22 | 9.77 648 | 29 | 0.22 352 | 9.93 367 | 8 | 8 | 1 | 2.1 | 2.1 |
| 53 | 9.71 036 | 21 | 9.77 677 | 29 | 0.22 323 | 9.93 360 | 7 | 7 | 2 | 6.4 | 6.2 |
| 54 | 9.71 058 | 22 | 9.77 706 | 28 | 0.22 294 | 9.93 352 | 8 | 6 | 3 | 10.7 | 10.4 |
| 55 | 9.71 079 | 21 | 9.77 734 | 29 | 0.22 266 | 9.93 344 | 7 | 5 | 4 | 15.0 | 14.5 |
| 56 | 9.71 100 | 22 | 9.77 763 | 29 | 0.22 237 | 9.93 337 | 8 | 4 | 5 | 19.3 | 18.6 |
| 57 | 9.71 121 | 21 | 9.77 791 | 28 | 0.22 209 | 9.93 329 | 7 | 3 | 6 | 23.6 | 22.8 |
| 58 | 9.71 142 | 22 | 9.77 820 | 29 | 0.22 180 | 9.93 322 | 8 | 2 | 7 | 27.9 | 26.9 |
| 59 | 9.71 163 | 21 | 9.77 849 | 28 | 0.22 151 | 9.93 314 | 7 | 1 | | | 26.0 |
| 60 | 9.71 184 | 22 | 9.77 877 | | 0.22 123 | 9.93 307 | | 0 | | | |
| ' | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | ' | P.P. | | |

120° (300°)

(239°) 59°

LOGARITHMS OF THE FUNCTIONS (Continued)

31° (211°)

(328°) 148°

| ' | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | ' | P.P. | | |
|----|----------|----|----------|------|----------|----------|----|----|------|------|------|
| 0 | 9.71 184 | 21 | 9.77 877 | 29 | 0.22 123 | 9.93 307 | 8 | 60 | | | |
| 1 | 9.71 205 | 21 | 9.77 906 | 29 | 0.22 094 | 9.93 299 | 8 | 59 | " | 29 | 28 |
| 2 | 9.71 226 | 21 | 9.77 935 | 29 | 0.22 065 | 9.93 291 | 8 | 58 | 1 | 0.5 | 0.3 |
| 3 | 9.71 247 | 21 | 9.77 963 | 28 | 0.22 037 | 9.93 284 | 7 | 57 | 2 | 1.0 | 0.9 |
| 4 | 9.71 268 | 21 | 9.77 992 | 28 | 0.22 008 | 9.93 276 | 8 | 56 | 3 | 1.4 | 1.4 |
| 5 | 9.71 289 | 21 | 9.78 020 | 28 | 0.21 980 | 9.93 269 | 7 | 55 | 4 | 1.9 | 1.9 |
| 6 | 9.71 310 | 21 | 9.78 049 | 29 | 0.21 951 | 9.93 261 | 8 | 54 | 5 | 2.4 | 2.3 |
| 7 | 9.71 331 | 21 | 9.78 077 | 28 | 0.21 923 | 9.93 253 | 8 | 53 | 6 | 2.9 | 2.8 |
| 8 | 9.71 352 | 21 | 9.78 106 | 29 | 0.21 894 | 9.93 246 | 7 | 52 | 7 | 3.4 | 3.3 |
| 9 | 9.71 373 | 21 | 9.78 135 | 29 | 0.21 865 | 9.93 238 | 8 | 51 | 8 | 3.9 | 3.7 |
| 10 | 9.71 393 | 20 | 9.78 163 | 28 | 0.21 837 | 9.93 230 | 8 | 50 | 9 | 4.4 | 4.2 |
| 11 | 9.71 414 | 21 | 9.78 192 | 29 | 0.21 808 | 9.93 223 | 7 | 49 | 10 | 4.8 | 4.7 |
| 12 | 9.71 435 | 21 | 9.78 220 | 28 | 0.21 780 | 9.93 215 | 8 | 48 | 20 | 9.7 | 9.3 |
| 13 | 9.71 456 | 21 | 9.78 249 | 29 | 0.21 751 | 9.93 207 | 8 | 47 | 30 | 14.5 | 14.0 |
| 14 | 9.71 477 | 21 | 9.78 277 | 28 | 0.21 723 | 9.93 200 | 7 | 46 | 40 | 19.3 | 18.7 |
| 15 | 9.71 498 | 21 | 9.78 306 | 28 | 0.21 694 | 9.93 192 | 8 | 45 | 50 | 24.2 | 23.3 |
| 16 | 9.71 519 | 21 | 9.78 334 | 28 | 0.21 666 | 9.93 184 | 8 | 44 | " | 21 | 20 |
| 17 | 9.71 539 | 20 | 9.78 363 | 29 | 0.21 637 | 9.93 177 | 7 | 43 | 1 | 0.4 | 0.3 |
| 18 | 9.71 560 | 21 | 9.78 391 | 28 | 0.21 609 | 9.93 169 | 8 | 42 | 2 | 0.7 | 0.7 |
| 19 | 9.71 581 | 21 | 9.78 419 | 29 | 0.21 581 | 9.93 161 | 8 | 41 | 3 | 1.0 | 1.0 |
| 20 | 9.71 602 | 20 | 9.78 448 | 28 | 0.21 552 | 9.93 154 | 7 | 40 | 4 | 1.4 | 1.3 |
| 21 | 9.71 622 | 20 | 9.78 476 | 28 | 0.21 524 | 9.93 146 | 8 | 39 | 5 | 1.8 | 1.7 |
| 22 | 9.71 643 | 21 | 9.78 505 | 29 | 0.21 495 | 9.93 138 | 8 | 38 | 6 | 2.1 | 2.0 |
| 23 | 9.71 664 | 21 | 9.78 533 | 28 | 0.21 467 | 9.93 131 | 7 | 37 | 7 | 2.4 | 2.3 |
| 24 | 9.71 685 | 20 | 9.78 562 | 29 | 0.21 438 | 9.93 123 | 8 | 36 | 8 | 2.8 | 2.7 |
| 25 | 9.71 705 | 21 | 9.78 590 | 28 | 0.21 410 | 9.93 115 | 8 | 35 | 9 | 3.2 | 3.0 |
| 26 | 9.71 726 | 21 | 9.78 618 | 28 | 0.21 382 | 9.93 108 | 7 | 34 | 10 | 3.5 | 3.3 |
| 27 | 9.71 747 | 21 | 9.78 647 | 29 | 0.21 353 | 9.93 100 | 8 | 33 | 20 | 7.0 | 6.7 |
| 28 | 9.71 767 | 20 | 9.78 675 | 28 | 0.21 325 | 9.93 092 | 8 | 32 | 30 | 10.5 | 10.0 |
| 29 | 9.71 788 | 21 | 9.78 704 | 29 | 0.21 296 | 9.93 084 | 8 | 31 | 40 | 14.0 | 13.3 |
| 30 | 9.71 809 | 20 | 9.78 732 | 28 | 0.21 268 | 9.93 077 | 7 | 30 | 50 | 17.5 | 16.7 |
| 31 | 9.71 829 | 21 | 9.78 760 | 29 | 0.21 240 | 9.93 069 | 8 | 29 | " | 8 | 7 |
| 32 | 9.71 850 | 21 | 9.78 789 | 28 | 0.21 211 | 9.93 061 | 8 | 28 | 1 | 0.1 | 0.1 |
| 33 | 9.71 870 | 20 | 9.78 817 | 28 | 0.21 183 | 9.93 053 | 8 | 27 | 2 | 0.3 | 0.2 |
| 34 | 9.71 891 | 20 | 9.78 845 | 29 | 0.21 155 | 9.93 046 | 7 | 26 | 3 | 0.4 | 0.4 |
| 35 | 9.71 911 | 21 | 9.78 874 | 28 | 0.21 126 | 9.93 038 | 8 | 25 | 4 | 0.5 | 0.5 |
| 36 | 9.71 932 | 21 | 9.78 902 | 28 | 0.21 098 | 9.93 030 | 8 | 24 | 5 | 0.7 | 0.6 |
| 37 | 9.71 952 | 20 | 9.78 930 | 28 | 0.21 070 | 9.93 022 | 8 | 23 | 6 | 0.8 | 0.7 |
| 38 | 9.71 973 | 21 | 9.78 959 | 29 | 0.21 041 | 9.93 014 | 8 | 22 | 7 | 0.9 | 0.8 |
| 39 | 9.71 994 | 21 | 9.78 987 | 28 | 0.21 013 | 9.93 007 | 7 | 21 | 8 | 1.1 | 0.9 |
| 40 | 9.72 014 | 20 | 9.79 015 | 28 | 0.20 985 | 9.92 999 | 8 | 20 | 9 | 1.2 | 1.0 |
| 41 | 9.72 034 | 20 | 9.79 043 | 28 | 0.20 957 | 9.92 991 | 8 | 19 | 10 | 1.3 | 1.2 |
| 42 | 9.72 055 | 21 | 9.79 072 | 29 | 0.20 928 | 9.92 983 | 8 | 18 | 20 | 2.7 | 2.3 |
| 43 | 9.72 075 | 20 | 9.79 100 | 28 | 0.20 900 | 9.92 976 | 7 | 17 | 30 | 4.0 | 3.5 |
| 44 | 9.72 096 | 20 | 9.79 128 | 28 | 0.20 872 | 9.92 968 | 8 | 16 | 40 | 5.3 | 4.7 |
| 45 | 9.72 116 | 21 | 9.79 156 | 29 | 0.20 844 | 9.92 960 | 8 | 15 | 50 | 6.7 | 5.8 |
| 46 | 9.72 137 | 21 | 9.79 185 | 29 | 0.20 815 | 9.92 952 | 8 | 14 | | | |
| 47 | 9.72 157 | 20 | 9.79 213 | 28 | 0.20 787 | 9.92 944 | 8 | 13 | | | |
| 48 | 9.72 177 | 20 | 9.79 241 | 28 | 0.20 759 | 9.92 936 | 8 | 12 | | | |
| 49 | 9.72 198 | 21 | 9.79 269 | 28 | 0.20 731 | 9.92 929 | 7 | 11 | | | |
| 50 | 9.72 218 | 20 | 9.79 297 | 28 | 0.20 703 | 9.92 921 | 8 | 10 | 8 | 8 | 8 |
| 51 | 9.72 238 | 20 | 9.79 326 | 29 | 0.20 674 | 9.92 913 | 8 | 9 | 30 | 29 | 28 |
| 52 | 9.72 259 | 21 | 9.79 354 | 28 | 0.20 646 | 9.92 905 | 8 | 8 | 0 | 1.9 | 1.8 |
| 53 | 9.72 279 | 20 | 9.79 382 | 28 | 0.20 618 | 9.92 897 | 8 | 7 | 1 | 5.6 | 5.4 |
| 54 | 9.72 299 | 21 | 9.79 410 | 28 | 0.20 590 | 9.92 889 | 8 | 6 | 2 | 9.4 | 9.1 |
| 55 | 9.72 320 | 20 | 9.79 438 | 28 | 0.20 562 | 9.92 881 | 8 | 5 | 3 | 13.1 | 12.7 |
| 56 | 9.72 340 | 20 | 9.79 466 | 28 | 0.20 534 | 9.92 874 | 7 | 4 | 4 | 16.9 | 16.3 |
| 57 | 9.72 360 | 21 | 9.79 495 | 29 | 0.20 505 | 9.92 866 | 8 | 3 | 5 | 20.6 | 19.9 |
| 58 | 9.72 381 | 21 | 9.79 523 | 28 | 0.20 477 | 9.92 858 | 8 | 2 | 6 | 24.4 | 23.6 |
| 59 | 9.72 401 | 20 | 9.79 551 | 28 | 0.20 449 | 9.92 850 | 8 | 1 | 7 | 28.1 | 27.2 |
| 60 | 9.72 421 | 20 | 9.79 579 | 28 | 0.20 421 | 9.92 842 | 8 | 0 | 8 | 28.1 | 27.2 |
| ' | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | ' | P.P. | | |

121° (301°)

(238°) 58°

LOGARITHMS OF THE FUNCTIONS (Continued)

32° (212°)

(327°) 147°

| | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | | P. P. |
|----|----------|----|----------|------|----------|----------|----|----|-------------------|
| 0 | 9.72 421 | 20 | 9.79 579 | 28 | 0.20 421 | 9.92 842 | 8 | 60 | " 29 28 27 |
| 1 | 9.72 441 | 20 | 9.79 607 | 28 | 0.20 393 | 9.92 834 | 8 | 59 | 1 0.5 0.5 0.4 |
| 2 | 9.72 461 | 20 | 9.79 635 | 28 | 0.20 365 | 9.92 826 | 8 | 58 | 2 1.0 0.9 0.9 |
| 3 | 9.72 482 | 21 | 9.79 663 | 28 | 0.20 337 | 9.92 818 | 8 | 57 | 3 1.4 1.4 1.4 |
| 4 | 9.72 502 | 20 | 9.79 691 | 28 | 0.20 309 | 9.92 810 | 8 | 56 | 4 1.9 1.9 1.8 |
| 5 | 9.72 522 | 20 | 9.79 719 | 28 | 0.20 281 | 9.92 803 | 7 | 55 | 5 2.4 2.3 2.2 |
| 6 | 9.72 542 | 20 | 9.79 747 | 28 | 0.20 253 | 9.92 795 | 8 | 54 | 6 2.9 2.8 2.7 |
| 7 | 9.72 562 | 20 | 9.79 776 | 29 | 0.20 224 | 9.92 787 | 8 | 53 | 7 3.4 3.3 3.2 |
| 8 | 9.72 582 | 20 | 9.79 804 | 28 | 0.20 196 | 9.92 779 | 8 | 52 | 8 3.9 3.7 3.6 |
| 9 | 9.72 602 | 20 | 9.79 832 | 28 | 0.20 168 | 9.92 771 | 8 | 51 | 9 4.4 4.2 4.0 |
| 10 | 9.72 622 | 20 | 9.79 860 | 28 | 0.20 140 | 9.92 763 | 8 | 50 | 10 4.8 4.7 4.5 |
| 11 | 9.72 643 | 21 | 9.79 888 | 28 | 0.20 112 | 9.92 755 | 8 | 49 | 20 9.7 9.3 9.0 |
| 12 | 9.72 663 | 20 | 9.79 916 | 28 | 0.20 084 | 9.92 747 | 8 | 48 | 30 14.5 14.0 13.5 |
| 13 | 9.72 683 | 20 | 9.79 944 | 28 | 0.20 056 | 9.92 739 | 8 | 47 | 40 19.3 18.7 18.0 |
| 14 | 9.72 703 | 20 | 9.79 972 | 28 | 0.20 028 | 9.92 731 | 8 | 46 | 50 24.2 23.3 22.5 |
| 15 | 9.72 723 | 20 | 9.80 000 | 28 | 0.20 000 | 9.92 723 | 45 | " | 21 20 19 |
| 16 | 9.72 743 | 20 | 9.80 028 | 28 | 0.19 972 | 9.92 715 | 8 | 44 | 1 0.4 0.3 0.3 |
| 17 | 9.72 763 | 20 | 9.80 056 | 28 | 0.19 944 | 9.92 707 | 8 | 43 | 2 0.7 0.7 0.6 |
| 18 | 9.72 783 | 20 | 9.80 084 | 28 | 0.19 916 | 9.92 699 | 8 | 42 | 3 1.0 1.0 1.0 |
| 19 | 9.72 803 | 20 | 9.80 112 | 28 | 0.19 888 | 9.92 691 | 8 | 41 | 4 1.4 1.3 1.3 |
| 20 | 9.72 823 | 20 | 9.80 140 | 28 | 0.19 860 | 9.92 683 | 8 | 40 | 5 1.8 1.7 1.6 |
| 21 | 9.72 843 | 20 | 9.80 168 | 28 | 0.19 832 | 9.92 675 | 8 | 39 | 6 2.1 2.0 1.9 |
| 22 | 9.72 863 | 20 | 9.80 195 | 27 | 0.19 805 | 9.92 667 | 8 | 38 | 7 2.4 2.3 2.2 |
| 23 | 9.72 883 | 19 | 9.80 223 | 28 | 0.19 777 | 9.92 659 | 8 | 37 | 8 2.8 2.7 2.6 |
| 24 | 9.72 902 | 20 | 9.80 251 | 28 | 0.19 749 | 9.92 651 | 8 | 36 | 9 3.2 3.0 2.8 |
| 25 | 9.72 922 | 20 | 9.80 279 | 28 | 0.19 721 | 9.92 643 | 8 | 35 | 10 3.5 3.3 3.2 |
| 26 | 9.72 942 | 20 | 9.80 307 | 28 | 0.19 693 | 9.92 635 | 8 | 34 | 20 7.0 6.7 6.3 |
| 27 | 9.72 962 | 20 | 9.80 335 | 28 | 0.19 665 | 9.92 627 | 8 | 33 | 30 10.5 10.0 9.5 |
| 28 | 9.72 982 | 20 | 9.80 363 | 28 | 0.19 637 | 9.92 619 | 8 | 32 | 40 14.0 13.3 12.7 |
| 29 | 9.73 002 | 20 | 9.80 391 | 28 | 0.19 609 | 9.92 611 | 8 | 31 | 50 17.5 16.7 15.8 |
| 30 | 9.73 022 | 19 | 9.80 419 | 28 | 0.19 581 | 9.92 603 | 8 | 30 | " 9 8 7 |
| 31 | 9.73 041 | 20 | 9.80 447 | 28 | 0.19 553 | 9.92 595 | 8 | 29 | 1 0.2 0.1 0.1 |
| 32 | 9.73 061 | 20 | 9.80 474 | 27 | 0.19 526 | 9.92 587 | 8 | 28 | 2 0.3 0.3 0.2 |
| 33 | 9.73 081 | 20 | 9.80 502 | 28 | 0.19 498 | 9.92 579 | 8 | 27 | 3 0.4 0.4 0.4 |
| 34 | 9.73 101 | 20 | 9.80 530 | 28 | 0.19 470 | 9.92 571 | 8 | 26 | 4 0.6 0.5 0.5 |
| 35 | 9.73 121 | 19 | 9.80 558 | 28 | 0.19 442 | 9.92 563 | 8 | 25 | 5 0.8 0.7 0.6 |
| 36 | 9.73 140 | 20 | 9.80 586 | 28 | 0.19 414 | 9.92 555 | 8 | 24 | 6 0.9 0.8 0.7 |
| 37 | 9.73 160 | 20 | 9.80 614 | 28 | 0.19 386 | 9.92 546 | 9 | 23 | 7 1.0 0.9 0.8 |
| 38 | 9.73 180 | 20 | 9.80 642 | 28 | 0.19 358 | 9.92 538 | 8 | 22 | 8 1.2 1.1 0.9 |
| 39 | 9.73 200 | 19 | 9.80 669 | 27 | 0.19 331 | 9.92 530 | 8 | 21 | 9 1.4 1.2 1.0 |
| 40 | 9.73 219 | 20 | 9.80 697 | 28 | 0.19 303 | 9.92 522 | 8 | 20 | 10 1.5 1.3 1.2 |
| 41 | 9.73 239 | 20 | 9.80 725 | 28 | 0.19 275 | 9.92 514 | 8 | 19 | 20 3.0 2.7 2.3 |
| 42 | 9.73 259 | 20 | 9.80 753 | 28 | 0.19 247 | 9.92 506 | 8 | 18 | 30 4.5 4.0 3.5 |
| 43 | 9.73 278 | 19 | 9.80 781 | 28 | 0.19 219 | 9.92 498 | 8 | 17 | 40 6.0 5.3 4.7 |
| 44 | 9.73 298 | 20 | 9.80 808 | 27 | 0.19 192 | 9.92 490 | 8 | 16 | 50 7.5 6.7 5.8 |
| 45 | 9.73 318 | 19 | 9.80 836 | 28 | 0.19 164 | 9.92 482 | 8 | 15 | |
| 46 | 9.73 337 | 20 | 9.80 864 | 28 | 0.19 136 | 9.92 473 | 8 | 14 | |
| 47 | 9.73 357 | 20 | 9.80 892 | 28 | 0.19 108 | 9.92 465 | 8 | 13 | |
| 48 | 9.73 377 | 19 | 9.80 919 | 27 | 0.19 081 | 9.92 457 | 8 | 12 | |
| 49 | 9.73 396 | 20 | 9.80 947 | 28 | 0.19 053 | 9.92 449 | 8 | 11 | |
| 50 | 9.73 416 | 19 | 9.80 975 | 28 | 0.19 025 | 9.92 441 | 8 | 10 | 0 1.8 1.8 2.0 |
| 51 | 9.73 435 | 20 | 9.81 003 | 27 | 0.18 997 | 9.92 433 | 8 | 9 | 2 5.4 5.2 6.0 |
| 52 | 9.73 455 | 19 | 9.81 030 | 28 | 0.18 970 | 9.92 425 | 8 | 8 | 3 9.1 8.8 10.0 |
| 53 | 9.73 474 | 20 | 9.81 058 | 28 | 0.18 942 | 9.92 416 | 8 | 7 | 4 12.7 12.2 14.0 |
| 54 | 9.73 494 | 19 | 9.81 086 | 27 | 0.18 914 | 9.92 408 | 8 | 6 | 5 16.3 15.8 18.0 |
| 55 | 9.73 513 | 20 | 9.81 113 | 28 | 0.18 887 | 9.92 400 | 8 | 5 | 6 19.9 19.2 22.0 |
| 56 | 9.73 533 | 19 | 9.81 141 | 28 | 0.18 859 | 9.92 392 | 8 | 4 | 7 23.6 22.8 26.0 |
| 57 | 9.73 552 | 20 | 9.81 169 | 27 | 0.18 831 | 9.92 384 | 8 | 3 | 8 27.2 26.2 — |
| 58 | 9.73 572 | 19 | 9.81 196 | 28 | 0.18 804 | 9.92 376 | 8 | 2 | |
| 59 | 9.73 591 | 20 | 9.81 224 | 28 | 0.18 776 | 9.92 367 | 8 | 1 | |
| 60 | 9.73 611 | 20 | 9.81 252 | 28 | 0.18 748 | 9.92 359 | 8 | 0 | |
| | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | | P. P. |

122° (302°)

(237°) 57°

LOGARITHMS OF THE FUNCTIONS (Continued)

33° (213°)

(326°) 146°

| ' | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | ' | P. P. | | |
|----|----------|----|----------|------|----------|----------|----|----|-------|------|------|
| 0 | 9.73 611 | 19 | 9.81 252 | 27 | 0.18 748 | 9.92 359 | 8 | 60 | " | 28 | 27 |
| 1 | 9.73 630 | 20 | 9.81 279 | 28 | 0.18 721 | 9.92 351 | 8 | 59 | 1 | 0.5 | 0.4 |
| 2 | 9.73 650 | 19 | 9.81 307 | 28 | 0.18 693 | 9.92 343 | 8 | 58 | 2 | 0.9 | 0.9 |
| 3 | 9.73 669 | 20 | 9.81 335 | 28 | 0.18 665 | 9.92 335 | 8 | 57 | 3 | 1.4 | 1.4 |
| 4 | 9.73 689 | 19 | 9.81 362 | 27 | 0.18 638 | 9.92 326 | 9 | 56 | 4 | 1.9 | 1.8 |
| 5 | 9.73 708 | 19 | 9.81 390 | 28 | 0.18 610 | 9.92 318 | 8 | 55 | 5 | 2.3 | 2.2 |
| 6 | 9.73 727 | 20 | 9.81 418 | 28 | 0.18 582 | 9.92 310 | 8 | 54 | 6 | 2.8 | 2.7 |
| 7 | 9.73 747 | 19 | 9.81 445 | 27 | 0.18 555 | 9.92 302 | 8 | 53 | 7 | 3.3 | 3.2 |
| 8 | 9.73 766 | 20 | 9.81 473 | 28 | 0.18 527 | 9.92 293 | 9 | 52 | 8 | 3.7 | 3.6 |
| 9 | 9.73 785 | 19 | 9.81 500 | 27 | 0.18 500 | 9.92 285 | 8 | 51 | 9 | 4.2 | 4.0 |
| 10 | 9.73 805 | 20 | 9.81 528 | 28 | 0.18 472 | 9.92 277 | 8 | 50 | 10 | 4.7 | 4.5 |
| 11 | 9.73 824 | 19 | 9.81 556 | 28 | 0.18 444 | 9.92 269 | 8 | 49 | 20 | 9.3 | 9.0 |
| 12 | 9.73 843 | 20 | 9.81 583 | 27 | 0.18 417 | 9.92 260 | 9 | 48 | 30 | 14.0 | 13.5 |
| 13 | 9.73 863 | 19 | 9.81 611 | 28 | 0.18 389 | 9.92 252 | 8 | 47 | 40 | 18.7 | 18.0 |
| 14 | 9.73 882 | 20 | 9.81 638 | 27 | 0.18 362 | 9.92 244 | 8 | 46 | 50 | 23.3 | 22.5 |
| 15 | 9.73 901 | 19 | 9.81 666 | 28 | 0.18 334 | 9.92 235 | 9 | 45 | " | 20 | 18 |
| 16 | 9.73 921 | 20 | 9.81 693 | 27 | 0.18 307 | 9.92 227 | 8 | 44 | 1 | 0.3 | 0.3 |
| 17 | 9.73 940 | 19 | 9.81 721 | 28 | 0.18 279 | 9.92 219 | 8 | 43 | 2 | 0.7 | 0.6 |
| 18 | 9.73 959 | 20 | 9.81 748 | 27 | 0.18 252 | 9.92 211 | 8 | 42 | 3 | 1.0 | 0.9 |
| 19 | 9.73 978 | 19 | 9.81 776 | 28 | 0.18 224 | 9.92 202 | 9 | 41 | 4 | 1.3 | 1.2 |
| 20 | 9.73 997 | 20 | 9.81 803 | 27 | 0.18 197 | 9.92 194 | 8 | 40 | 5 | 1.7 | 1.6 |
| 21 | 9.74 017 | 19 | 9.81 831 | 28 | 0.18 169 | 9.92 186 | 8 | 39 | 6 | 2.0 | 1.9 |
| 22 | 9.74 036 | 20 | 9.81 858 | 27 | 0.18 142 | 9.92 177 | 9 | 38 | 7 | 2.3 | 2.2 |
| 23 | 9.74 055 | 19 | 9.81 886 | 28 | 0.18 114 | 9.92 169 | 8 | 37 | 8 | 2.7 | 2.5 |
| 24 | 9.74 074 | 20 | 9.81 913 | 27 | 0.18 087 | 9.92 161 | 8 | 36 | 9 | 3.0 | 2.8 |
| 25 | 9.74 093 | 19 | 9.81 941 | 28 | 0.18 059 | 9.92 152 | 9 | 35 | 10 | 3.3 | 3.2 |
| 26 | 9.74 113 | 20 | 9.81 968 | 27 | 0.18 032 | 9.92 144 | 8 | 34 | 20 | 6.7 | 6.3 |
| 27 | 9.74 132 | 19 | 9.81 996 | 28 | 0.18 004 | 9.92 136 | 8 | 33 | 30 | 10.0 | 9.5 |
| 28 | 9.74 151 | 20 | 9.82 023 | 27 | 0.17 977 | 9.92 127 | 9 | 32 | 40 | 13.3 | 12.7 |
| 29 | 9.74 170 | 19 | 9.82 051 | 28 | 0.17 949 | 9.92 119 | 8 | 31 | 50 | 16.7 | 15.8 |
| 30 | 9.74 189 | 20 | 9.82 078 | 27 | 0.17 922 | 9.92 111 | 8 | 30 | " | 9 | 8 |
| 31 | 9.74 208 | 19 | 9.82 106 | 28 | 0.17 894 | 9.92 102 | 9 | 29 | 1 | 0.2 | 0.1 |
| 32 | 9.74 227 | 20 | 9.82 133 | 27 | 0.17 867 | 9.92 094 | 8 | 28 | 2 | 0.3 | 0.3 |
| 33 | 9.74 246 | 19 | 9.82 161 | 28 | 0.17 839 | 9.92 086 | 8 | 27 | 3 | 0.4 | 0.4 |
| 34 | 9.74 265 | 20 | 9.82 188 | 27 | 0.17 812 | 9.92 077 | 9 | 26 | 4 | 0.6 | 0.5 |
| 35 | 9.74 284 | 19 | 9.82 215 | 28 | 0.17 785 | 9.92 069 | 8 | 25 | 5 | 0.8 | 0.7 |
| 36 | 9.74 303 | 20 | 9.82 243 | 27 | 0.17 757 | 9.92 060 | 9 | 24 | 6 | 0.9 | 0.8 |
| 37 | 9.74 322 | 19 | 9.82 270 | 28 | 0.17 730 | 9.92 052 | 8 | 23 | 7 | 1.0 | 0.9 |
| 38 | 9.74 341 | 20 | 9.82 298 | 27 | 0.17 702 | 9.92 044 | 8 | 22 | 8 | 1.2 | 1.1 |
| 39 | 9.74 360 | 19 | 9.82 325 | 28 | 0.17 675 | 9.92 035 | 9 | 21 | 9 | 1.4 | 1.2 |
| 40 | 9.74 379 | 20 | 9.82 352 | 27 | 0.17 648 | 9.92 027 | 8 | 20 | 10 | 1.5 | 1.3 |
| 41 | 9.74 398 | 19 | 9.82 380 | 28 | 0.17 620 | 9.92 018 | 9 | 19 | 20 | 3.0 | 2.7 |
| 42 | 9.74 417 | 20 | 9.82 407 | 27 | 0.17 593 | 9.92 010 | 8 | 18 | 30 | 4.5 | 4.0 |
| 43 | 9.74 436 | 19 | 9.82 435 | 28 | 0.17 565 | 9.92 002 | 8 | 17 | 40 | 6.0 | 5.3 |
| 44 | 9.74 455 | 20 | 9.82 462 | 27 | 0.17 538 | 9.91 993 | 9 | 16 | 50 | 7.5 | 6.7 |
| 45 | 9.74 474 | 19 | 9.82 489 | 28 | 0.17 511 | 9.91 985 | 8 | 15 | | | |
| 46 | 9.74 493 | 20 | 9.82 517 | 27 | 0.17 483 | 9.91 976 | 9 | 14 | | | |
| 47 | 9.74 512 | 19 | 9.82 544 | 28 | 0.17 456 | 9.91 968 | 8 | 13 | | | |
| 48 | 9.74 531 | 20 | 9.82 571 | 27 | 0.17 429 | 9.91 959 | 9 | 12 | | | |
| 49 | 9.74 549 | 19 | 9.82 599 | 28 | 0.17 401 | 9.91 951 | 8 | 11 | | | |
| 50 | 9.74 568 | 20 | 9.82 626 | 27 | 0.17 374 | 9.91 942 | 9 | 10 | 0 | 1.6 | 1.5 |
| 51 | 9.74 587 | 19 | 9.82 653 | 28 | 0.17 347 | 9.91 934 | 8 | 9 | 1 | 4.7 | 4.5 |
| 52 | 9.74 606 | 20 | 9.82 681 | 27 | 0.17 319 | 9.91 925 | 9 | 8 | 2 | 7.8 | 7.5 |
| 53 | 9.74 625 | 19 | 9.82 708 | 28 | 0.17 292 | 9.91 917 | 8 | 7 | 3 | 10.9 | 10.5 |
| 54 | 9.74 644 | 20 | 9.82 735 | 27 | 0.17 265 | 9.91 908 | 9 | 6 | 4 | 14.0 | 13.5 |
| 55 | 9.74 662 | 19 | 9.82 762 | 28 | 0.17 238 | 9.91 900 | 8 | 5 | 5 | 17.1 | 16.5 |
| 56 | 9.74 681 | 20 | 9.82 790 | 27 | 0.17 210 | 9.91 891 | 9 | 4 | 6 | 20.2 | 19.5 |
| 57 | 9.74 700 | 19 | 9.82 817 | 28 | 0.17 183 | 9.91 883 | 8 | 3 | 7 | 23.3 | 22.5 |
| 58 | 9.74 719 | 20 | 9.82 844 | 27 | 0.17 156 | 9.91 874 | 9 | 2 | 8 | 26.4 | 25.5 |
| 59 | 9.74 737 | 19 | 9.82 871 | 28 | 0.17 129 | 9.91 866 | 8 | 1 | 9 | | |
| 60 | 9.74 756 | 20 | 9.82 899 | 27 | 0.17 101 | 9.91 857 | 9 | 0 | | | |
| ' | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | ' | P. P. | | |

123° (308°)

(236°) 56°

LOGARITHMS OF THE FUNCTIONS (Continued)

34° (214°)

(325°) 145°

| ' | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | ' | P.P. | | | |
|----|----------|----|----------|------|----------|----------|----|----|------|------|------|------|
| 0 | 9.74 756 | | 9.82 899 | | 0.17 101 | 9.91 857 | | 60 | " | 28 | 27 | 26 |
| 1 | 9.74 775 | 19 | 9.82 926 | 27 | 0.17 074 | 9.91 849 | 8 | 59 | 1 | 0.5 | 0.4 | 0.4 |
| 2 | 9.74 794 | 19 | 9.82 953 | 27 | 0.17 047 | 9.91 840 | 9 | 58 | 2 | 0.9 | 0.9 | 0.9 |
| 3 | 9.74 812 | 18 | 9.82 980 | 27 | 0.17 020 | 9.91 832 | 8 | 57 | 3 | 1.4 | 1.4 | 1.3 |
| 4 | 9.74 831 | 19 | 9.83 008 | 28 | 0.16 992 | 9.91 823 | 9 | 56 | 4 | 1.9 | 1.8 | 1.7 |
| 5 | 9.74 850 | | 9.83 035 | 27 | 0.16 965 | 9.91 815 | 8 | 55 | 5 | 2.3 | 2.2 | 2.2 |
| 6 | 9.74 868 | 18 | 9.83 062 | 27 | 0.16 938 | 9.91 806 | 9 | 54 | 6 | 2.8 | 2.7 | 2.6 |
| 7 | 9.74 887 | 19 | 9.83 089 | 27 | 0.16 911 | 9.91 798 | 8 | 53 | 7 | 3.3 | 3.2 | 3.0 |
| 8 | 9.74 906 | 19 | 9.83 117 | 28 | 0.16 883 | 9.91 789 | 9 | 52 | 8 | 3.7 | 3.6 | 3.5 |
| 9 | 9.74 924 | 18 | 9.83 144 | 27 | 0.16 856 | 9.91 781 | 8 | 51 | 9 | 4.2 | 4.0 | 3.9 |
| 10 | 9.74 943 | 19 | 9.83 171 | 27 | 0.16 829 | 9.91 772 | 9 | 50 | 10 | 4.7 | 4.5 | 4.3 |
| 11 | 9.74 961 | 18 | 9.83 198 | 27 | 0.16 802 | 9.91 763 | 8 | 49 | 20 | 9.3 | 9.0 | 8.7 |
| 12 | 9.74 980 | 19 | 9.83 225 | 27 | 0.16 775 | 9.91 755 | 9 | 48 | 30 | 14.0 | 13.5 | 13.0 |
| 13 | 9.74 999 | 19 | 9.83 252 | 27 | 0.16 748 | 9.91 746 | 8 | 47 | 40 | 18.7 | 18.0 | 17.3 |
| 14 | 9.75 017 | 18 | 9.83 280 | 28 | 0.16 720 | 9.91 738 | 9 | 46 | 50 | 23.3 | 22.5 | 21.7 |
| 15 | 9.75 036 | | 9.83 307 | 27 | 0.16 693 | 9.91 729 | 8 | 45 | " | 19 | 18 | |
| 16 | 9.75 054 | 18 | 9.83 334 | 27 | 0.16 666 | 9.91 720 | 9 | 44 | 1 | 0.3 | 0.3 | |
| 17 | 9.75 073 | 19 | 9.83 361 | 27 | 0.16 639 | 9.91 712 | 8 | 43 | 2 | 0.6 | 0.6 | |
| 18 | 9.75 091 | 18 | 9.83 388 | 27 | 0.16 612 | 9.91 703 | 9 | 42 | 3 | 1.0 | 0.9 | |
| 19 | 9.75 110 | 19 | 9.83 415 | 27 | 0.16 585 | 9.91 695 | 8 | 41 | 4 | 1.3 | 1.2 | |
| 20 | 9.75 128 | | 9.83 442 | 27 | 0.16 558 | 9.91 686 | 9 | 40 | 5 | 1.6 | 1.5 | |
| 21 | 9.75 147 | 19 | 9.83 470 | 28 | 0.16 530 | 9.91 677 | 8 | 39 | 6 | 1.9 | 1.8 | |
| 22 | 9.75 165 | 18 | 9.83 497 | 27 | 0.16 503 | 9.91 669 | 9 | 38 | 7 | 2.2 | 2.1 | |
| 23 | 9.75 184 | 19 | 9.83 524 | 27 | 0.16 476 | 9.91 660 | 8 | 37 | 8 | 2.5 | 2.4 | |
| 24 | 9.75 202 | 18 | 9.83 551 | 27 | 0.16 449 | 9.91 651 | 9 | 36 | 9 | 2.8 | 2.7 | |
| 25 | 9.75 221 | 19 | 9.83 578 | 27 | 0.16 422 | 9.91 643 | 8 | 35 | 10 | 3.2 | 3.0 | |
| 26 | 9.75 239 | 18 | 9.83 605 | 27 | 0.16 395 | 9.91 634 | 9 | 34 | 20 | 6.3 | 6.0 | |
| 27 | 9.75 258 | 19 | 9.83 632 | 27 | 0.16 368 | 9.91 625 | 8 | 33 | 30 | 9.5 | 9.0 | |
| 28 | 9.75 276 | 18 | 9.83 659 | 27 | 0.16 341 | 9.91 617 | 9 | 32 | 40 | 12.7 | 12.0 | |
| 29 | 9.75 294 | 19 | 9.83 686 | 27 | 0.16 314 | 9.91 608 | 8 | 31 | 50 | 15.8 | 15.0 | |
| 30 | 9.75 313 | | 9.83 713 | 27 | 0.16 287 | 9.91 599 | 9 | 30 | " | 9 | 8 | |
| 31 | 9.75 331 | 18 | 9.83 740 | 27 | 0.16 260 | 9.91 591 | 8 | 29 | 1 | 0.2 | 0.1 | |
| 32 | 9.75 350 | 19 | 9.83 768 | 28 | 0.16 232 | 9.91 582 | 9 | 28 | 2 | 0.3 | 0.3 | |
| 33 | 9.75 368 | 18 | 9.83 795 | 27 | 0.16 205 | 9.91 573 | 8 | 27 | 3 | 0.4 | 0.4 | |
| 34 | 9.75 386 | 19 | 9.83 822 | 27 | 0.16 178 | 9.91 565 | 9 | 26 | 4 | 0.6 | 0.5 | |
| 35 | 9.75 405 | | 9.83 849 | 27 | 0.16 151 | 9.91 556 | 8 | 25 | 5 | 0.8 | 0.7 | |
| 36 | 9.75 423 | 18 | 9.83 876 | 27 | 0.16 124 | 9.91 547 | 9 | 24 | 6 | 0.9 | 0.8 | |
| 37 | 9.75 441 | 19 | 9.83 903 | 27 | 0.16 097 | 9.91 538 | 8 | 23 | 7 | 1.0 | 0.9 | |
| 38 | 9.75 459 | 18 | 9.83 930 | 27 | 0.16 070 | 9.91 530 | 9 | 22 | 8 | 1.2 | 1.1 | |
| 39 | 9.75 478 | 19 | 9.83 957 | 27 | 0.16 043 | 9.91 521 | 8 | 21 | 9 | 1.4 | 1.2 | |
| 40 | 9.75 496 | | 9.83 984 | 27 | 0.16 016 | 9.91 512 | 9 | 20 | 10 | 1.5 | 1.3 | |
| 41 | 9.75 514 | 18 | 9.84 011 | 27 | 0.15 989 | 9.91 504 | 8 | 19 | 20 | 3.0 | 2.7 | |
| 42 | 9.75 533 | 19 | 9.84 038 | 27 | 0.15 962 | 9.91 495 | 9 | 18 | 30 | 4.5 | 4.0 | |
| 43 | 9.75 551 | 18 | 9.84 065 | 27 | 0.15 935 | 9.91 486 | 8 | 17 | 40 | 6.0 | 5.3 | |
| 44 | 9.75 569 | 19 | 9.84 092 | 27 | 0.15 908 | 9.91 477 | 9 | 16 | 50 | 7.5 | 6.7 | |
| 45 | 9.75 587 | | 9.84 119 | 27 | 0.15 881 | 9.91 469 | 8 | 15 | | | | |
| 46 | 9.75 605 | 18 | 9.84 146 | 27 | 0.15 854 | 9.91 460 | 9 | 14 | | | | |
| 47 | 9.75 624 | 19 | 9.84 173 | 27 | 0.15 827 | 9.91 451 | 8 | 13 | | | | |
| 48 | 9.75 642 | 18 | 9.84 200 | 27 | 0.15 800 | 9.91 442 | 9 | 12 | | | | |
| 49 | 9.75 660 | 19 | 9.84 227 | 27 | 0.15 773 | 9.91 433 | 8 | 11 | | | | |
| 50 | 9.75 678 | | 9.84 254 | 26 | 0.15 746 | 9.91 425 | 9 | 10 | 9 | 1.6 | 1.8 | 1.7 |
| 51 | 9.75 696 | 18 | 9.84 280 | 27 | 0.15 720 | 9.91 416 | 8 | 9 | 0 | 4.7 | 5.2 | 5.1 |
| 52 | 9.75 714 | 19 | 9.84 307 | 27 | 0.15 693 | 9.91 407 | 9 | 8 | 1 | 7.8 | 8.8 | 8.4 |
| 53 | 9.75 733 | 18 | 9.84 334 | 27 | 0.15 666 | 9.91 398 | 8 | 7 | 2 | 10.9 | 12.2 | 11.8 |
| 54 | 9.75 751 | 19 | 9.84 361 | 27 | 0.15 639 | 9.91 389 | 9 | 6 | 3 | 14.0 | 15.8 | 15.2 |
| 55 | 9.75 769 | | 9.84 388 | 27 | 0.15 612 | 9.91 381 | 8 | 5 | 4 | 17.1 | 19.2 | 18.6 |
| 56 | 9.75 787 | 18 | 9.84 415 | 27 | 0.15 585 | 9.91 372 | 9 | 4 | 5 | 20.2 | 22.8 | 21.9 |
| 57 | 9.75 805 | 19 | 9.84 442 | 27 | 0.15 558 | 9.91 363 | 8 | 3 | 6 | 23.3 | 26.2 | 25.3 |
| 58 | 9.75 823 | 18 | 9.84 469 | 27 | 0.15 531 | 9.91 354 | 9 | 2 | 7 | 26.4 | — | — |
| 59 | 9.75 841 | 19 | 9.84 496 | 27 | 0.15 504 | 9.91 345 | 8 | 1 | 8 | | | |
| 60 | 9.75 859 | | 9.84 523 | 27 | 0.15 477 | 9.91 336 | 9 | 0 | 9 | | | |
| ' | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | ' | P.P. | | | |

124° (304°)

(235°) 55°

LOGARITHMS OF THE FUNCTIONS (Continued)

35° (215°)

(324°) 144°

| | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | | P.P. |
|----|----------|----|----------|------|----------|----------|----|----|---------------------|
| 0 | 9.75 859 | | 9.84 523 | | 0.15 477 | 9.91 336 | | 60 | |
| 1 | 9.75 877 | 18 | 9.84 550 | 27 | 0.15 450 | 9.91 328 | 8 | 59 | " 27 26 18 |
| 2 | 9.75 895 | 18 | 9.84 576 | 26 | 0.15 424 | 9.91 319 | 9 | 58 | 1 0.4 0.4 0.3 |
| 3 | 9.75 913 | 18 | 9.84 603 | 27 | 0.15 397 | 9.91 310 | 9 | 57 | 2 0.9 0.9 0.6 |
| 4 | 9.75 931 | 18 | 9.84 630 | 27 | 0.15 370 | 9.91 301 | 9 | 56 | 3 1.4 1.3 0.9 |
| 5 | 9.75 949 | 18 | 9.84 657 | 27 | 0.15 343 | 9.91 292 | 9 | 55 | 4 1.8 1.7 1.2 |
| 6 | 9.75 967 | 18 | 9.84 684 | 27 | 0.15 316 | 9.91 283 | 9 | 54 | 5 2.2 2.2 1.5 |
| 7 | 9.75 985 | 18 | 9.84 711 | 27 | 0.15 289 | 9.91 274 | 9 | 53 | 6 2.7 2.6 1.8 |
| 8 | 9.76 003 | 18 | 9.84 738 | 26 | 0.15 262 | 9.91 266 | 8 | 52 | 7 3.2 3.0 2.1 |
| 9 | 9.76 021 | 18 | 9.84 764 | 27 | 0.15 236 | 9.91 257 | 9 | 51 | 8 3.6 3.5 2.4 |
| 10 | 9.76 039 | 18 | 9.84 791 | 27 | 0.15 209 | 9.91 248 | 9 | 50 | 9 4.0 3.9 2.7 |
| 11 | 9.76 057 | 18 | 9.84 818 | 27 | 0.15 182 | 9.91 239 | 9 | 49 | 10 4.5 4.3 3.0 |
| 12 | 9.76 075 | 18 | 9.84 845 | 27 | 0.15 155 | 9.91 230 | 9 | 48 | 20 9.0 8.7 6.0 |
| 13 | 9.76 093 | 18 | 9.84 872 | 27 | 0.15 128 | 9.91 221 | 9 | 47 | 30 13.5 13.0 9.0 |
| 14 | 9.76 111 | 18 | 9.84 899 | 26 | 0.15 101 | 9.91 212 | 9 | 46 | 40 18.0 17.3 12.0 |
| 15 | 9.76 129 | 17 | 9.84 925 | 27 | 0.15 075 | 9.91 203 | 9 | 45 | 50 22.5 21.7 15.0 |
| 16 | 9.76 146 | 18 | 9.84 952 | 27 | 0.15 048 | 9.91 194 | 9 | 44 | |
| 17 | 9.76 164 | 18 | 9.84 979 | 27 | 0.15 021 | 9.91 185 | 9 | 43 | " 17 10 9 8 |
| 18 | 9.76 182 | 18 | 9.85 006 | 27 | 0.14 994 | 9.91 176 | 9 | 42 | 1 0.3 0.2 0.2 0.1 |
| 19 | 9.76 200 | 18 | 9.85 033 | 26 | 0.14 967 | 9.91 167 | 9 | 41 | 2 0.6 0.3 0.3 0.3 |
| 20 | 9.76 218 | 18 | 9.85 059 | 27 | 0.14 941 | 9.91 158 | 9 | 40 | 3 0.8 0.5 0.4 0.4 |
| 21 | 9.76 236 | 18 | 9.85 086 | 27 | 0.14 914 | 9.91 149 | 9 | 39 | 4 1.1 0.7 0.6 0.5 |
| 22 | 9.76 253 | 17 | 9.85 113 | 27 | 0.14 887 | 9.91 141 | 8 | 38 | 5 1.4 0.8 0.8 0.7 |
| 23 | 9.76 271 | 18 | 9.85 140 | 27 | 0.14 860 | 9.91 132 | 9 | 37 | 6 1.7 1.0 0.9 0.8 |
| 24 | 9.76 289 | 18 | 9.85 166 | 26 | 0.14 834 | 9.91 123 | 9 | 36 | 7 2.0 1.2 1.0 0.9 |
| 25 | 9.76 307 | 17 | 9.85 193 | 27 | 0.14 807 | 9.91 114 | 9 | 35 | 8 2.3 1.3 1.2 1.1 |
| 26 | 9.76 324 | 18 | 9.85 220 | 27 | 0.14 780 | 9.91 105 | 9 | 34 | 9 2.6 1.5 1.4 1.2 |
| 27 | 9.76 342 | 18 | 9.85 247 | 27 | 0.14 753 | 9.91 096 | 9 | 33 | 10 2.8 1.7 1.5 1.3 |
| 28 | 9.76 360 | 18 | 9.85 273 | 26 | 0.14 727 | 9.91 087 | 9 | 32 | 20 5.7 3.3 3.0 2.7 |
| 29 | 9.76 378 | 18 | 9.85 300 | 27 | 0.14 700 | 9.91 078 | 9 | 31 | 30 8.5 5.0 4.5 4.0 |
| 30 | 9.76 395 | 17 | 9.85 327 | 27 | 0.14 673 | 9.91 069 | 9 | 30 | 40 11.3 6.7 6.0 5.3 |
| 31 | 9.76 413 | 18 | 9.85 354 | 26 | 0.14 646 | 9.91 060 | 9 | 29 | 50 14.2 8.3 7.5 6.7 |
| 32 | 9.76 431 | 18 | 9.85 380 | 27 | 0.14 620 | 9.91 051 | 9 | 28 | |
| 33 | 9.76 448 | 17 | 9.85 407 | 27 | 0.14 593 | 9.91 042 | 9 | 27 | |
| 34 | 9.76 466 | 18 | 9.85 434 | 26 | 0.14 566 | 9.91 033 | 9 | 26 | |
| 35 | 9.76 484 | 17 | 9.85 460 | 27 | 0.14 540 | 9.91 023 | 10 | 25 | 10 10 |
| 36 | 9.76 501 | 18 | 9.85 487 | 27 | 0.14 513 | 9.91 014 | 9 | 24 | 27 26 |
| 37 | 9.76 519 | 18 | 9.85 514 | 26 | 0.14 486 | 9.91 005 | 9 | 23 | 0 1.4 1.3 |
| 38 | 9.76 537 | 18 | 9.85 540 | 27 | 0.14 460 | 9.90 996 | 9 | 22 | 1 4.1 3.9 |
| 39 | 9.76 554 | 17 | 9.85 567 | 27 | 0.14 433 | 9.90 987 | 9 | 21 | 2 6.8 6.5 |
| 40 | 9.76 572 | 18 | 9.85 594 | 26 | 0.14 406 | 9.90 978 | 9 | 20 | 3 9.4 9.1 |
| 41 | 9.76 590 | 17 | 9.85 620 | 27 | 0.14 380 | 9.90 969 | 9 | 19 | 4 12.2 11.7 |
| 42 | 9.76 607 | 18 | 9.85 647 | 27 | 0.14 353 | 9.90 960 | 9 | 18 | 5 14.8 14.3 |
| 43 | 9.76 625 | 18 | 9.85 674 | 26 | 0.14 326 | 9.90 951 | 9 | 17 | 6 17.6 16.9 |
| 44 | 9.76 642 | 17 | 9.85 700 | 27 | 0.14 300 | 9.90 942 | 9 | 16 | 7 20.2 19.5 |
| 45 | 9.76 660 | 18 | 9.85 727 | 27 | 0.14 273 | 9.90 933 | 9 | 15 | 8 22.9 22.1 |
| 46 | 9.76 677 | 17 | 9.85 754 | 27 | 0.14 246 | 9.90 924 | 9 | 14 | 9 25.6 24.7 |
| 47 | 9.76 695 | 18 | 9.85 780 | 26 | 0.14 220 | 9.90 915 | 9 | 13 | |
| 48 | 9.76 712 | 17 | 9.85 807 | 27 | 0.14 193 | 9.90 906 | 9 | 12 | 9 9 |
| 49 | 9.76 730 | 18 | 9.85 834 | 26 | 0.14 166 | 9.90 896 | 10 | 11 | 27 26 |
| 50 | 9.76 747 | 17 | 9.85 860 | 27 | 0.14 140 | 9.90 887 | 9 | 10 | 0 1.5 1.4 |
| 51 | 9.76 765 | 18 | 9.85 887 | 26 | 0.14 113 | 9.90 878 | 9 | 9 | 1 4.5 4.3 |
| 52 | 9.76 782 | 17 | 9.85 913 | 27 | 0.14 087 | 9.90 869 | 9 | 8 | 2 7.5 7.2 |
| 53 | 9.76 800 | 18 | 9.85 940 | 27 | 0.14 060 | 9.90 860 | 9 | 7 | 3 10.5 10.1 |
| 54 | 9.76 817 | 17 | 9.85 967 | 26 | 0.14 033 | 9.90 851 | 9 | 6 | 4 13.5 13.0 |
| 55 | 9.76 835 | 18 | 9.85 993 | 27 | 0.14 007 | 9.90 842 | 9 | 5 | 5 16.5 15.9 |
| 56 | 9.76 852 | 17 | 9.86 020 | 26 | 0.13 980 | 9.90 832 | 10 | 4 | 6 19.5 18.8 |
| 57 | 9.76 870 | 18 | 9.86 046 | 27 | 0.13 954 | 9.90 823 | 9 | 3 | 7 22.5 21.7 |
| 58 | 9.76 887 | 17 | 9.86 073 | 27 | 0.13 927 | 9.90 814 | 9 | 2 | 8 25.5 24.8 |
| 59 | 9.76 904 | 18 | 9.86 100 | 26 | 0.13 900 | 9.90 805 | 9 | 1 | |
| 60 | 9.76 922 | 18 | 9.86 126 | | 0.13 874 | 9.90 796 | 9 | 0 | |
| | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | | P.P. |

125° (305°)

(234°) 54°

LOGARITHMS OF THE FUNCTIONS (Continued)

36° (216°)

(323°) 143°

| ' | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | ' | P. P. | | |
|----|----------|----|----------|------|----------|----------|----|----|-------|------|------|
| 0 | 9.76 922 | | 9.86 126 | | 0.13 874 | 9.90 796 | | 60 | | | |
| 1 | 9.76 939 | 17 | 9.86 153 | 27 | 0.13 847 | 9.90 787 | 9 | 59 | " | 27 | 26 |
| 2 | 9.76 957 | 18 | 9.86 179 | 26 | 0.13 821 | 9.90 777 | 10 | 58 | 1 | 0.4 | 0.4 |
| 3 | 9.76 974 | 17 | 9.86 206 | 27 | 0.13 794 | 9.90 768 | 9 | 57 | 2 | 0.9 | 0.9 |
| 4 | 9.76 991 | 17 | 9.86 232 | 26 | 0.13 768 | 9.90 759 | 9 | 56 | 3 | 1.4 | 1.3 |
| | | 18 | | 27 | | | 9 | 55 | 4 | 1.8 | 1.7 |
| 5 | 9.77 009 | | 9.86 259 | | 0.13 741 | 9.90 750 | | 54 | 5 | 2.2 | 2.2 |
| 6 | 9.77 026 | 17 | 9.86 285 | 26 | 0.13 715 | 9.90 741 | 10 | 53 | 6 | 2.7 | 2.6 |
| 7 | 9.77 043 | 17 | 9.86 312 | 27 | 0.13 688 | 9.90 731 | 9 | 52 | 7 | 3.2 | 3.0 |
| 8 | 9.77 061 | 18 | 9.86 338 | 26 | 0.13 662 | 9.90 722 | 9 | 51 | 8 | 3.6 | 3.5 |
| 9 | 9.77 078 | 17 | 9.86 365 | 27 | 0.13 635 | 9.90 713 | 9 | 50 | 9 | 4.0 | 3.9 |
| | | 17 | | 27 | | | 10 | 49 | 10 | 4.5 | 4.3 |
| 10 | 9.77 095 | | 9.86 392 | | 0.13 608 | 9.90 704 | | 48 | 20 | 9.0 | 8.7 |
| 11 | 9.77 112 | 17 | 9.86 418 | 26 | 0.13 582 | 9.90 694 | 9 | 47 | 30 | 13.5 | 13.0 |
| 12 | 9.77 130 | 18 | 9.86 445 | 27 | 0.13 555 | 9.90 685 | 9 | 46 | 40 | 18.0 | 17.3 |
| 13 | 9.77 147 | 17 | 9.86 471 | 26 | 0.13 529 | 9.90 676 | 10 | 45 | 50 | 22.5 | 21.7 |
| 14 | 9.77 164 | 17 | 9.86 498 | 27 | 0.13 502 | 9.90 667 | 9 | 44 | | | |
| | | 18 | | 26 | | | 9 | 43 | " | 18 | 17 |
| 15 | 9.77 181 | | 9.86 524 | | 0.13 476 | 9.90 657 | | 42 | 1 | 0.3 | 0.3 |
| 16 | 9.77 199 | 17 | 9.86 551 | 26 | 0.13 449 | 9.90 648 | 9 | 41 | 2 | 0.6 | 0.6 |
| 17 | 9.77 216 | 17 | 9.86 577 | 27 | 0.13 423 | 9.90 639 | 10 | 40 | 3 | 0.9 | 0.8 |
| 18 | 9.77 233 | 17 | 9.86 603 | 26 | 0.13 397 | 9.90 630 | 9 | 39 | 4 | 1.2 | 1.1 |
| 19 | 9.77 250 | 18 | 9.86 630 | 27 | 0.13 370 | 9.90 621 | 9 | 38 | 5 | 1.5 | 1.4 |
| | | 17 | | 26 | | | 10 | 37 | 6 | 1.8 | 1.7 |
| 20 | 9.77 268 | | 9.86 656 | | 0.13 344 | 9.90 611 | | 36 | 7 | 2.1 | 2.0 |
| 21 | 9.77 285 | 17 | 9.86 683 | 27 | 0.13 317 | 9.90 602 | 9 | 35 | 8 | 2.4 | 2.3 |
| 22 | 9.77 302 | 17 | 9.86 709 | 26 | 0.13 291 | 9.90 592 | 9 | 34 | 9 | 2.7 | 2.6 |
| 23 | 9.77 319 | 17 | 9.86 736 | 27 | 0.13 264 | 9.90 583 | 10 | 33 | 10 | 3.0 | 2.8 |
| 24 | 9.77 336 | 17 | 9.86 762 | 26 | 0.13 238 | 9.90 574 | 9 | 32 | 20 | 6.0 | 5.7 |
| | | 18 | | 27 | | | 10 | 31 | 30 | 9.0 | 8.5 |
| 25 | 9.77 353 | | 9.86 789 | | 0.13 211 | 9.90 565 | | 30 | 40 | 12.0 | 11.3 |
| 26 | 9.77 370 | 17 | 9.86 815 | 26 | 0.13 185 | 9.90 555 | 9 | 29 | 50 | 15.0 | 14.2 |
| 27 | 9.77 387 | 17 | 9.86 842 | 27 | 0.13 158 | 9.90 546 | 10 | 28 | " | 10 | 9 |
| 28 | 9.77 405 | 18 | 9.86 868 | 26 | 0.13 132 | 9.90 537 | 9 | 27 | 1 | 0.2 | 0.2 |
| 29 | 9.77 422 | 17 | 9.86 894 | 27 | 0.13 106 | 9.90 527 | 9 | 26 | 2 | 0.3 | 0.3 |
| | | 17 | | 26 | | | 10 | 25 | 3 | 0.5 | 0.4 |
| 30 | 9.77 439 | | 9.86 921 | | 0.13 079 | 9.90 518 | | 24 | 4 | 0.7 | 0.6 |
| 31 | 9.77 456 | 17 | 9.86 947 | 26 | 0.13 053 | 9.90 509 | 9 | 23 | 5 | 0.8 | 0.8 |
| 32 | 9.77 473 | 17 | 9.86 974 | 27 | 0.13 026 | 9.90 499 | 10 | 22 | 6 | 1.0 | 0.9 |
| 33 | 9.77 490 | 17 | 9.87 000 | 26 | 0.13 000 | 9.90 490 | 9 | 21 | 7 | 1.2 | 1.0 |
| 34 | 9.77 507 | 17 | 9.87 027 | 27 | 0.12 973 | 9.90 480 | 10 | 20 | 8 | 1.3 | 1.2 |
| | | 18 | | 26 | | | 9 | 19 | 9 | 1.5 | 1.4 |
| 35 | 9.77 524 | | 9.87 053 | | 0.12 947 | 9.90 471 | | 18 | 10 | 1.7 | 1.5 |
| 36 | 9.77 541 | 17 | 9.87 079 | 26 | 0.12 921 | 9.90 462 | 9 | 17 | 20 | 3.3 | 3.0 |
| 37 | 9.77 558 | 17 | 9.87 106 | 27 | 0.12 894 | 9.90 452 | 10 | 16 | 30 | 5.0 | 4.5 |
| 38 | 9.77 575 | 17 | 9.87 132 | 26 | 0.12 868 | 9.90 443 | 9 | 15 | 40 | 6.7 | 6.0 |
| 39 | 9.77 592 | 17 | 9.87 158 | 27 | 0.12 842 | 9.90 434 | 9 | 14 | 50 | 8.3 | 7.5 |
| | | 18 | | 26 | | | 10 | 13 | | | |
| 40 | 9.77 609 | | 9.87 185 | | 0.12 815 | 9.90 424 | | 12 | | | |
| 41 | 9.77 626 | 17 | 9.87 211 | 26 | 0.12 789 | 9.90 415 | 9 | 11 | | | |
| 42 | 9.77 643 | 17 | 9.87 238 | 27 | 0.12 762 | 9.90 405 | 10 | 10 | | | |
| 43 | 9.77 660 | 17 | 9.87 264 | 26 | 0.12 736 | 9.90 396 | 9 | 9 | | | |
| 44 | 9.77 677 | 17 | 9.87 290 | 27 | 0.12 710 | 9.90 386 | 10 | 8 | | | |
| | | 18 | | 26 | | | 9 | 7 | | | |
| 45 | 9.77 694 | | 9.87 317 | | 0.12 683 | 9.90 377 | | 6 | | | |
| 46 | 9.77 711 | 17 | 9.87 343 | 26 | 0.12 657 | 9.90 368 | 9 | 5 | | | |
| 47 | 9.77 728 | 17 | 9.87 369 | 27 | 0.12 631 | 9.90 358 | 10 | 4 | | | |
| 48 | 9.77 744 | 16 | 9.87 396 | 26 | 0.12 604 | 9.90 349 | 9 | 3 | | | |
| 49 | 9.77 761 | 17 | 9.87 422 | 27 | 0.12 578 | 9.90 339 | 10 | 2 | | | |
| | | 17 | | 26 | | | 9 | 1 | | | |
| 50 | 9.77 778 | | 9.87 448 | | 0.12 552 | 9.90 330 | | 0 | | | |
| 51 | 9.77 795 | 17 | 9.87 475 | 27 | 0.12 525 | 9.90 320 | 10 | | | | |
| 52 | 9.77 812 | 17 | 9.87 501 | 26 | 0.12 499 | 9.90 311 | 9 | | | | |
| 53 | 9.77 829 | 17 | 9.87 527 | 27 | 0.12 473 | 9.90 301 | 10 | | | | |
| 54 | 9.77 846 | 16 | 9.87 554 | 26 | 0.12 446 | 9.90 292 | 9 | | | | |
| | | 17 | | 26 | | | 10 | | | | |
| 55 | 9.77 862 | | 9.87 580 | | 0.12 420 | 9.90 282 | | | | | |
| 56 | 9.77 879 | 17 | 9.87 606 | 27 | 0.12 394 | 9.90 273 | 9 | | | | |
| 57 | 9.77 896 | 17 | 9.87 633 | 26 | 0.12 367 | 9.90 263 | 10 | | | | |
| 58 | 9.77 913 | 17 | 9.87 659 | 27 | 0.12 341 | 9.90 254 | 9 | | | | |
| 59 | 9.77 930 | 17 | 9.87 685 | 26 | 0.12 315 | 9.90 244 | 10 | | | | |
| 60 | 9.77 946 | 16 | 9.87 711 | 26 | 0.12 289 | 9.90 235 | 9 | | | | |
| | | | | | | | 0 | | | | |
| ' | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | ' | P. P. | | |

126° (306°)

(233°) 53°

LOGARITHMS OF THE FUNCTIONS (Continued)

37° (217°)

(322°) 142°

| | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | | P. P. |
|----|----------|----|----------|------|----------|----------|----|----|--------------|
| 0 | 9.77 946 | | 9.87 711 | | 0.12 289 | 9.90 235 | | 60 | |
| 1 | 9.77 963 | 17 | 9.87 738 | 27 | 0.12 262 | 9.90 225 | 10 | 59 | " 27 26 |
| 2 | 9.77 980 | 17 | 9.87 764 | 26 | 0.12 236 | 9.90 216 | 9 | 58 | 1 0.4 0.4 |
| 3 | 9.77 997 | 17 | 9.87 790 | 26 | 0.12 210 | 9.90 206 | 10 | 57 | 2 0.9 0.9 |
| 4 | 9.78 013 | 16 | 9.87 817 | 27 | 0.12 183 | 9.90 197 | 9 | 56 | 3 1.4 1.3 |
| | | 17 | | 26 | | | 10 | | 4 1.8 1.7 |
| 5 | 9.78 030 | | 9.87 843 | | 0.12 157 | 9.90 187 | | 55 | |
| 6 | 9.78 047 | 17 | 9.87 869 | 26 | 0.12 131 | 9.90 178 | 9 | 54 | 5 2.2 2.2 |
| 7 | 9.78 063 | 16 | 9.87 895 | 26 | 0.12 105 | 9.90 168 | 10 | 53 | 6 2.7 2.6 |
| 8 | 9.78 080 | 17 | 9.87 922 | 27 | 0.12 078 | 9.90 159 | 9 | 52 | 7 3.2 3.0 |
| 9 | 9.78 097 | 17 | 9.87 948 | 26 | 0.12 052 | 9.90 149 | 10 | 51 | 8 3.6 3.5 |
| | | 16 | | 26 | | | 10 | | 9 4.0 3.9 |
| 10 | 9.78 113 | | 9.87 974 | | 0.12 026 | 9.90 139 | | 50 | |
| 11 | 9.78 130 | 17 | 9.88 000 | 26 | 0.12 000 | 9.90 130 | 9 | 49 | 10 4.5 4.3 |
| 12 | 9.78 147 | 17 | 9.88 027 | 27 | 0.11 973 | 9.90 120 | 10 | 48 | 20 9.0 8.7 |
| 13 | 9.78 163 | 16 | 9.88 053 | 26 | 0.11 947 | 9.90 111 | 9 | 47 | 30 13.5 13.0 |
| 14 | 9.78 180 | 17 | 9.88 079 | 26 | 0.11 921 | 9.90 101 | 10 | 46 | 40 18.0 17.3 |
| | | 17 | | 26 | | | 10 | | 50 22.5 21.7 |
| 15 | 9.78 197 | | 9.88 105 | | 0.11 895 | 9.90 091 | | 45 | |
| 16 | 9.78 213 | 16 | 9.88 131 | 26 | 0.11 869 | 9.90 082 | 9 | 44 | " 17 16 |
| 17 | 9.78 230 | 17 | 9.88 158 | 27 | 0.11 842 | 9.90 072 | 10 | 43 | 1 0.3 0.3 |
| 18 | 9.78 246 | 16 | 9.88 184 | 26 | 0.11 816 | 9.90 063 | 9 | 42 | 2 0.6 0.5 |
| 19 | 9.78 263 | 17 | 9.88 210 | 26 | 0.11 790 | 9.90 053 | 10 | 41 | 3 0.8 0.8 |
| | | 17 | | 26 | | | 10 | | 4 1.1 1.1 |
| 20 | 9.78 280 | | 9.88 236 | | 0.11 764 | 9.90 043 | | 40 | |
| 21 | 9.78 296 | 16 | 9.88 262 | 26 | 0.11 738 | 9.90 034 | 9 | 39 | 5 1.4 1.3 |
| 22 | 9.78 313 | 17 | 9.88 289 | 27 | 0.11 711 | 9.90 024 | 10 | 38 | 6 1.7 1.6 |
| 23 | 9.78 329 | 16 | 9.88 315 | 26 | 0.11 685 | 9.90 014 | 9 | 37 | 7 2.0 1.9 |
| 24 | 9.78 346 | 17 | 9.88 341 | 26 | 0.11 659 | 9.90 005 | 10 | 36 | 8 2.3 2.1 |
| | | 16 | | 26 | | | 9 | | 9 2.6 2.4 |
| 25 | 9.78 362 | | 9.88 367 | | 0.11 633 | 9.89 995 | | 35 | |
| 26 | 9.78 379 | 17 | 9.88 393 | 26 | 0.11 607 | 9.89 985 | 10 | 34 | 10 2.8 2.7 |
| 27 | 9.78 395 | 16 | 9.88 420 | 27 | 0.11 580 | 9.89 976 | 9 | 33 | 20 5.7 5.3 |
| 28 | 9.78 412 | 17 | 9.88 446 | 26 | 0.11 554 | 9.89 966 | 10 | 32 | 30 8.5 8.0 |
| 29 | 9.78 428 | 16 | 9.88 472 | 26 | 0.11 528 | 9.89 956 | 9 | 31 | 40 11.3 10.7 |
| | | 17 | | 26 | | | 9 | | 50 14.2 13.3 |
| 30 | 9.78 445 | | 9.88 498 | | 0.11 502 | 9.89 947 | | 30 | |
| 31 | 9.78 461 | 16 | 9.88 524 | 26 | 0.11 476 | 9.89 937 | 10 | 29 | " 10 9 |
| 32 | 9.78 478 | 17 | 9.88 550 | 26 | 0.11 450 | 9.89 927 | 10 | 28 | 1 0.2 0.2 |
| 33 | 9.78 494 | 16 | 9.88 577 | 27 | 0.11 423 | 9.89 918 | 9 | 27 | 2 0.3 0.3 |
| 34 | 9.78 510 | 16 | 9.88 603 | 26 | 0.11 397 | 9.89 908 | 10 | 26 | 3 0.5 0.4 |
| | | 17 | | 26 | | | 10 | | 4 0.7 0.6 |
| 35 | 9.78 527 | | 9.88 629 | | 0.11 371 | 9.89 898 | | 25 | |
| 36 | 9.78 543 | 16 | 9.88 655 | 26 | 0.11 345 | 9.89 888 | 10 | 24 | 5 0.8 0.8 |
| 37 | 9.78 560 | 17 | 9.88 681 | 26 | 0.11 319 | 9.89 879 | 9 | 23 | 6 1.0 0.9 |
| 38 | 9.78 576 | 16 | 9.88 707 | 26 | 0.11 293 | 9.89 869 | 10 | 22 | 7 1.2 1.0 |
| 39 | 9.78 592 | 17 | 9.88 733 | 26 | 0.11 267 | 9.89 859 | 10 | 21 | 8 1.3 1.2 |
| | | 17 | | 26 | | | 10 | | 9 1.5 1.4 |
| 40 | 9.78 609 | | 9.88 759 | | 0.11 241 | 9.89 849 | | 20 | |
| 41 | 9.78 625 | 16 | 9.88 786 | 27 | 0.11 214 | 9.89 840 | 9 | 19 | 10 1.7 1.5 |
| 42 | 9.78 642 | 17 | 9.88 812 | 26 | 0.11 188 | 9.89 830 | 10 | 18 | 20 3.3 3.0 |
| 43 | 9.78 658 | 16 | 9.88 838 | 26 | 0.11 162 | 9.89 820 | 9 | 17 | 30 5.0 4.5 |
| 44 | 9.78 674 | 17 | 9.88 864 | 26 | 0.11 136 | 9.89 810 | 10 | 16 | 40 6.7 6.0 |
| | | 17 | | 26 | | | 9 | | 50 8.3 7.5 |
| 45 | 9.78 691 | | 9.88 890 | | 0.11 110 | 9.89 801 | | 15 | |
| 46 | 9.78 707 | 16 | 9.88 916 | 26 | 0.11 084 | 9.89 791 | 10 | 14 | |
| 47 | 9.78 723 | 17 | 9.88 942 | 26 | 0.11 058 | 9.89 781 | 10 | 13 | |
| 48 | 9.78 739 | 16 | 9.88 968 | 26 | 0.11 032 | 9.89 771 | 10 | 12 | 10 10 |
| 49 | 9.78 756 | 17 | 9.88 994 | 26 | 0.11 006 | 9.89 761 | 10 | 11 | 27 26 |
| | | 16 | | 26 | | | 9 | | |
| 50 | 9.78 772 | | 9.89 020 | | 0.10 980 | 9.89 752 | | 10 | |
| 51 | 9.78 788 | 16 | 9.89 046 | 26 | 0.10 954 | 9.89 742 | 10 | 9 | 1 1.4 1.3 |
| 52 | 9.78 805 | 17 | 9.89 073 | 27 | 0.10 927 | 9.89 732 | 10 | 8 | 2 4.1 3.9 |
| 53 | 9.78 821 | 16 | 9.89 099 | 26 | 0.10 901 | 9.89 722 | 10 | 7 | 3 6.8 6.5 |
| 54 | 9.78 837 | 17 | 9.89 125 | 26 | 0.10 875 | 9.89 712 | 10 | 6 | 4 9.4 9.1 |
| | | 16 | | 26 | | | 10 | | 5 12.2 11.7 |
| 55 | 9.78 853 | | 9.89 151 | | 0.10 849 | 9.89 702 | | 5 | |
| 56 | 9.78 869 | 16 | 9.89 177 | 26 | 0.10 823 | 9.89 693 | 9 | 4 | 6 14.8 14.3 |
| 57 | 9.78 886 | 17 | 9.89 203 | 26 | 0.10 797 | 9.89 683 | 10 | 3 | 7 17.6 16.9 |
| 58 | 9.78 902 | 16 | 9.89 229 | 26 | 0.10 771 | 9.89 673 | 10 | 2 | 8 20.2 19.5 |
| 59 | 9.78 918 | 17 | 9.89 255 | 26 | 0.10 745 | 9.89 663 | 10 | 1 | 9 22.9 22.1 |
| | | 16 | | 26 | | | 10 | | 10 25.6 24.7 |
| 60 | 9.78 934 | | 9.89 281 | | 0.10 719 | 9.89 653 | | 0 | |
| | | | | | | | | | |
| | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | | P. P. |

127° (307°)

(232°) 52°

LOGARITHMS OF THE FUNCTIONS (Continued)

38° (218°)

(321°) 141°

| ' | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | ' | P. P. | | |
|----|----------|----|----------|------|----------|----------|----|----|-------|------|------|
| 0 | 9.78 934 | | 9.89 281 | | 0.10 719 | 9.89 653 | | 60 | " | 26 | 25 |
| 1 | 9.78 950 | 16 | 9.89 307 | 26 | 0.10 693 | 9.89 643 | 10 | 59 | 1 | 0.4 | 0.4 |
| 2 | 9.78 967 | 17 | 9.89 333 | 26 | 0.10 667 | 9.89 633 | 10 | 58 | 2 | 0.9 | 0.8 |
| 3 | 9.78 983 | 16 | 9.89 359 | 26 | 0.10 641 | 9.89 624 | 9 | 57 | 3 | 1.3 | 1.2 |
| 4 | 9.78 999 | 16 | 9.89 385 | 26 | 0.10 615 | 9.89 614 | 10 | 56 | 4 | 1.7 | 1.7 |
| 5 | 9.79 015 | 16 | 9.89 411 | 26 | 0.10 589 | 9.89 604 | 10 | 55 | 5 | 2.2 | 2.1 |
| 6 | 9.79 031 | 16 | 9.89 437 | 26 | 0.10 563 | 9.89 594 | 10 | 54 | 6 | 2.6 | 2.5 |
| 7 | 9.79 047 | 16 | 9.89 463 | 26 | 0.10 537 | 9.89 584 | 10 | 53 | 7 | 3.0 | 2.9 |
| 8 | 9.79 063 | 16 | 9.89 489 | 26 | 0.10 511 | 9.89 574 | 10 | 52 | 8 | 3.5 | 3.3 |
| 9 | 9.79 079 | 16 | 9.89 515 | 26 | 0.10 485 | 9.89 564 | 10 | 51 | 9 | 3.9 | 3.8 |
| 10 | 9.79 095 | 16 | 9.89 541 | 26 | 0.10 459 | 9.89 554 | 10 | 50 | 10 | 4.3 | 4.2 |
| 11 | 9.79 111 | 16 | 9.89 567 | 26 | 0.10 433 | 9.89 544 | 10 | 49 | 20 | 8.7 | 8.3 |
| 12 | 9.79 128 | 17 | 9.89 593 | 26 | 0.10 407 | 9.89 534 | 10 | 48 | 30 | 13.0 | 12.5 |
| 13 | 9.79 144 | 16 | 9.89 619 | 26 | 0.10 381 | 9.89 524 | 10 | 47 | 40 | 17.3 | 16.7 |
| 14 | 9.79 160 | 16 | 9.89 645 | 26 | 0.10 355 | 9.89 514 | 10 | 46 | 50 | 21.7 | 20.8 |
| 15 | 9.79 176 | 16 | 9.89 671 | 26 | 0.10 329 | 9.89 504 | 10 | 45 | " | 17 | 16 |
| 16 | 9.79 192 | 16 | 9.89 697 | 26 | 0.10 303 | 9.89 495 | 9 | 44 | 1 | 0.3 | 0.3 |
| 17 | 9.79 208 | 16 | 9.89 723 | 26 | 0.10 277 | 9.89 485 | 10 | 43 | 2 | 0.6 | 0.5 |
| 18 | 9.79 224 | 16 | 9.89 749 | 26 | 0.10 251 | 9.89 475 | 10 | 42 | 3 | 0.8 | 0.8 |
| 19 | 9.79 240 | 16 | 9.89 775 | 26 | 0.10 225 | 9.89 465 | 10 | 41 | 4 | 1.1 | 1.1 |
| 20 | 9.79 256 | 16 | 9.89 801 | 26 | 0.10 199 | 9.89 455 | 10 | 40 | 5 | 1.4 | 1.3 |
| 21 | 9.79 272 | 16 | 9.89 827 | 26 | 0.10 173 | 9.89 445 | 10 | 39 | 6 | 1.7 | 1.6 |
| 22 | 9.79 288 | 16 | 9.89 853 | 26 | 0.10 147 | 9.89 435 | 10 | 38 | 7 | 2.0 | 1.9 |
| 23 | 9.79 304 | 16 | 9.89 879 | 26 | 0.10 121 | 9.89 425 | 10 | 37 | 8 | 2.3 | 2.1 |
| 24 | 9.79 319 | 15 | 9.89 905 | 26 | 0.10 095 | 9.89 415 | 10 | 36 | 9 | 2.6 | 2.4 |
| 25 | 9.79 335 | 16 | 9.89 931 | 26 | 0.10 069 | 9.89 405 | 10 | 35 | 10 | 2.8 | 2.7 |
| 26 | 9.79 351 | 16 | 9.89 957 | 26 | 0.10 043 | 9.89 395 | 10 | 34 | 20 | 5.7 | 5.3 |
| 27 | 9.79 367 | 16 | 9.89 983 | 26 | 0.10 017 | 9.89 385 | 10 | 33 | 30 | 8.5 | 8.0 |
| 28 | 9.79 383 | 16 | 9.90 009 | 26 | 0.09 991 | 9.89 375 | 10 | 32 | 40 | 11.3 | 10.7 |
| 29 | 9.79 399 | 16 | 9.90 035 | 26 | 0.09 965 | 9.89 364 | 11 | 31 | 50 | 14.2 | 13.3 |
| 30 | 9.79 415 | 16 | 9.90 061 | 25 | 0.09 939 | 9.89 354 | 10 | 30 | " | 11 | 10 |
| 31 | 9.79 431 | 16 | 9.90 086 | 26 | 0.09 914 | 9.89 344 | 10 | 29 | 1 | 0.2 | 0.2 |
| 32 | 9.79 447 | 16 | 9.90 112 | 26 | 0.09 888 | 9.89 334 | 10 | 28 | 2 | 0.4 | 0.3 |
| 33 | 9.79 463 | 16 | 9.90 138 | 26 | 0.09 862 | 9.89 324 | 10 | 27 | 3 | 0.6 | 0.5 |
| 34 | 9.79 478 | 15 | 9.90 164 | 26 | 0.09 836 | 9.89 314 | 10 | 26 | 4 | 0.7 | 0.7 |
| 35 | 9.79 494 | 16 | 9.90 190 | 26 | 0.09 810 | 9.89 304 | 10 | 25 | 5 | 0.9 | 0.8 |
| 36 | 9.79 510 | 16 | 9.90 216 | 26 | 0.09 784 | 9.89 294 | 10 | 24 | 6 | 1.1 | 1.0 |
| 37 | 9.79 526 | 16 | 9.90 242 | 26 | 0.09 758 | 9.89 284 | 10 | 23 | 7 | 1.3 | 1.2 |
| 38 | 9.79 542 | 16 | 9.90 268 | 26 | 0.09 732 | 9.89 274 | 10 | 22 | 8 | 1.5 | 1.3 |
| 39 | 9.79 558 | 15 | 9.90 294 | 26 | 0.09 706 | 9.89 264 | 10 | 21 | 9 | 1.6 | 1.5 |
| 40 | 9.79 573 | 16 | 9.90 320 | 26 | 0.09 680 | 9.89 254 | 10 | 20 | 10 | 1.8 | 1.7 |
| 41 | 9.79 589 | 16 | 9.90 346 | 26 | 0.09 654 | 9.89 244 | 10 | 19 | 20 | 3.7 | 3.3 |
| 42 | 9.79 605 | 16 | 9.90 371 | 25 | 0.09 629 | 9.89 233 | 11 | 18 | 30 | 5.5 | 5.0 |
| 43 | 9.79 621 | 16 | 9.90 397 | 26 | 0.09 603 | 9.89 223 | 10 | 17 | 40 | 7.3 | 6.7 |
| 44 | 9.79 636 | 15 | 9.90 423 | 26 | 0.09 577 | 9.89 213 | 10 | 16 | 50 | 9.2 | 8.3 |
| 45 | 9.79 652 | 16 | 9.90 449 | 26 | 0.09 551 | 9.89 203 | 10 | 15 | | | |
| 46 | 9.79 668 | 16 | 9.90 475 | 26 | 0.09 525 | 9.89 193 | 10 | 14 | | | |
| 47 | 9.79 684 | 16 | 9.90 501 | 26 | 0.09 499 | 9.89 183 | 10 | 13 | | | |
| 48 | 9.79 699 | 15 | 9.90 527 | 26 | 0.09 473 | 9.89 173 | 10 | 12 | | | |
| 49 | 9.79 715 | 16 | 9.90 553 | 26 | 0.09 447 | 9.89 162 | 11 | 11 | 0 | 1.3 | 1.2 |
| 50 | 9.79 731 | 15 | 9.90 578 | 25 | 0.09 422 | 9.89 152 | 10 | 10 | 1 | 3.9 | 3.8 |
| 51 | 9.79 746 | 16 | 9.90 604 | 26 | 0.09 396 | 9.89 142 | 10 | 9 | 2 | 6.5 | 6.2 |
| 52 | 9.79 762 | 16 | 9.90 630 | 26 | 0.09 370 | 9.89 132 | 10 | 8 | 3 | 9.1 | 8.8 |
| 53 | 9.79 778 | 16 | 9.90 656 | 26 | 0.09 344 | 9.89 122 | 10 | 7 | 4 | 11.7 | 11.2 |
| 54 | 9.79 793 | 15 | 9.90 682 | 26 | 0.09 318 | 9.89 112 | 10 | 6 | 5 | 14.3 | 13.8 |
| 55 | 9.79 809 | 16 | 9.90 708 | 26 | 0.09 292 | 9.89 101 | 11 | 5 | 6 | 16.9 | 16.2 |
| 56 | 9.79 825 | 16 | 9.90 734 | 26 | 0.09 266 | 9.89 091 | 10 | 4 | 7 | 19.5 | 18.8 |
| 57 | 9.79 840 | 15 | 9.90 759 | 25 | 0.09 241 | 9.89 081 | 10 | 3 | 8 | 22.1 | 21.2 |
| 58 | 9.79 856 | 16 | 9.90 785 | 26 | 0.09 215 | 9.89 071 | 10 | 2 | 9 | 24.7 | 23.8 |
| 59 | 9.79 872 | 16 | 9.90 811 | 26 | 0.09 189 | 9.89 060 | 11 | 1 | 10 | | |
| 60 | 9.79 887 | 15 | 9.90 837 | 26 | 0.09 163 | 9.89 050 | 10 | 0 | | | |
| ' | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | ' | P. P. | | |

128° (308°)

(231°) 51°

LOGARITHMS OF THE FUNCTIONS (Continued)

39° (219°)

(320°) 140°

| ' | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | ' | P. P. | | |
|----|----------|----|----------|------|----------|----------|----|----|-------|------|------|
| 0 | 9.79 887 | | 9.90 837 | | 0.09 163 | 9.89 060 | | 60 | " | 26 | 25 |
| 1 | 9.79 903 | 16 | 9.90 863 | 26 | 0.09 137 | 9.89 040 | 10 | 59 | 1 | 0.4 | 0.4 |
| 2 | 9.79 918 | 15 | 9.90 889 | 26 | 0.09 111 | 9.89 030 | 10 | 58 | 2 | 0.9 | 0.8 |
| 3 | 9.79 934 | 16 | 9.90 914 | 25 | 0.09 086 | 9.89 020 | 10 | 57 | 3 | 1.3 | 1.2 |
| 4 | 9.79 950 | 16 | 9.90 940 | 26 | 0.09 060 | 9.89 009 | 11 | 56 | 4 | 1.7 | 1.7 |
| 5 | 9.79 965 | 15 | 9.90 966 | 26 | 0.09 034 | 9.88 999 | 10 | 55 | 5 | 2.2 | 2.1 |
| 6 | 9.79 981 | 16 | 9.90 992 | 26 | 0.09 008 | 9.88 989 | 10 | 54 | 6 | 2.6 | 2.5 |
| 7 | 9.79 996 | 15 | 9.91 018 | 26 | 0.08 982 | 9.88 978 | 11 | 53 | 7 | 3.0 | 2.9 |
| 8 | 9.80 012 | 16 | 9.91 043 | 25 | 0.08 957 | 9.88 968 | 10 | 52 | 8 | 3.5 | 3.3 |
| 9 | 9.80 027 | 15 | 9.91 069 | 26 | 0.08 931 | 9.88 958 | 10 | 51 | 9 | 3.9 | 3.8 |
| | | 16 | | 26 | | | 10 | | | | |
| 10 | 9.80 043 | | 9.91 095 | | 0.08 905 | 9.88 948 | | 50 | 10 | 4.3 | 4.2 |
| 11 | 9.80 058 | 15 | 9.91 121 | 26 | 0.08 879 | 9.88 937 | 11 | 49 | 20 | 8.7 | 8.3 |
| 12 | 9.80 074 | 16 | 9.91 147 | 26 | 0.08 853 | 9.88 927 | 10 | 48 | 30 | 13.0 | 12.5 |
| 13 | 9.80 089 | 15 | 9.91 172 | 25 | 0.08 828 | 9.88 917 | 10 | 47 | 40 | 17.3 | 16.7 |
| 14 | 9.80 105 | 16 | 9.91 198 | 26 | 0.08 802 | 9.88 906 | 11 | 46 | 50 | 21.7 | 20.8 |
| | | 15 | | 26 | | | 10 | | " | 16 | 15 |
| 15 | 9.80 120 | | 9.91 224 | | 0.08 776 | 9.88 896 | | 45 | 1 | 0.3 | 0.2 |
| 16 | 9.80 136 | 16 | 9.91 250 | 26 | 0.08 750 | 9.88 886 | 10 | 44 | 2 | 0.6 | 0.5 |
| 17 | 9.80 151 | 15 | 9.91 276 | 26 | 0.08 724 | 9.88 875 | 11 | 43 | 3 | 0.8 | 0.8 |
| 18 | 9.80 166 | 15 | 9.91 301 | 25 | 0.08 699 | 9.88 865 | 10 | 42 | 4 | 1.1 | 1.0 |
| 19 | 9.80 182 | 16 | 9.91 327 | 26 | 0.08 673 | 9.88 855 | 11 | 41 | 5 | 1.3 | 1.2 |
| | | 15 | | 26 | | | 10 | | 6 | 1.6 | 1.5 |
| 20 | 9.80 197 | | 9.91 353 | | 0.08 647 | 9.88 844 | | 40 | 7 | 1.9 | 1.8 |
| 21 | 9.80 213 | 16 | 9.91 379 | 26 | 0.08 621 | 9.88 834 | 10 | 39 | 8 | 2.1 | 2.0 |
| 22 | 9.80 228 | 15 | 9.91 404 | 25 | 0.08 596 | 9.88 824 | 10 | 38 | 9 | 2.4 | 2.2 |
| 23 | 9.80 244 | 16 | 9.91 430 | 26 | 0.08 570 | 9.88 813 | 11 | 37 | 10 | 2.7 | 2.5 |
| 24 | 9.80 259 | 15 | 9.91 456 | 26 | 0.08 544 | 9.88 803 | 10 | 36 | 20 | 5.3 | 5.0 |
| | | 15 | | 26 | | | 10 | | 30 | 8.0 | 7.5 |
| 25 | 9.80 274 | | 9.91 482 | | 0.08 518 | 9.88 793 | | 35 | 40 | 10.7 | 10.0 |
| 26 | 9.80 290 | 16 | 9.91 507 | 25 | 0.08 493 | 9.88 782 | 11 | 34 | 50 | 13.3 | 12.5 |
| 27 | 9.80 305 | 15 | 9.91 533 | 26 | 0.08 467 | 9.88 772 | 10 | 33 | " | 11 | 10 |
| 28 | 9.80 320 | 15 | 9.91 559 | 26 | 0.08 441 | 9.88 761 | 11 | 32 | 1 | 0.2 | 0.2 |
| 29 | 9.80 336 | 16 | 9.91 585 | 26 | 0.08 415 | 9.88 751 | 10 | 31 | 2 | 0.4 | 0.3 |
| | | 15 | | 25 | | | 10 | | 3 | 0.6 | 0.5 |
| 30 | 9.80 351 | | 9.91 610 | | 0.08 390 | 9.88 741 | | 30 | 4 | 0.7 | 0.7 |
| 31 | 9.80 366 | 15 | 9.91 636 | 26 | 0.08 364 | 9.88 730 | 11 | 29 | 5 | 0.9 | 0.8 |
| 32 | 9.80 382 | 16 | 9.91 662 | 26 | 0.08 338 | 9.88 720 | 10 | 28 | 6 | 1.1 | 1.0 |
| 33 | 9.80 397 | 15 | 9.91 688 | 26 | 0.08 312 | 9.88 709 | 11 | 27 | 7 | 1.3 | 1.2 |
| 34 | 9.80 412 | 15 | 9.91 713 | 25 | 0.08 287 | 9.88 699 | 10 | 26 | 8 | 1.5 | 1.3 |
| | | 16 | | 26 | | | 11 | | 9 | 1.6 | 1.5 |
| 35 | 9.80 428 | | 9.91 739 | | 0.08 261 | 9.88 688 | | 25 | 10 | 1.8 | 1.7 |
| 36 | 9.80 443 | 15 | 9.91 765 | 26 | 0.08 235 | 9.88 678 | 10 | 24 | 20 | 3.7 | 3.3 |
| 37 | 9.80 458 | 15 | 9.91 791 | 26 | 0.08 209 | 9.88 668 | 10 | 23 | 30 | 5.5 | 5.0 |
| 38 | 9.80 473 | 15 | 9.91 816 | 25 | 0.08 184 | 9.88 657 | 11 | 22 | 40 | 7.3 | 6.7 |
| 39 | 9.80 489 | 16 | 9.91 842 | 26 | 0.08 158 | 9.88 647 | 10 | 21 | 50 | 9.2 | 8.3 |
| | | 15 | | 26 | | | 11 | | " | 11 | 10 |
| 40 | 9.80 504 | | 9.91 868 | | 0.08 132 | 9.88 636 | | 20 | 1 | 0.2 | 0.2 |
| 41 | 9.80 519 | 15 | 9.91 893 | 25 | 0.08 107 | 9.88 626 | 10 | 19 | 2 | 0.4 | 0.3 |
| 42 | 9.80 534 | 15 | 9.91 919 | 26 | 0.08 081 | 9.88 615 | 11 | 18 | 3 | 0.6 | 0.5 |
| 43 | 9.80 550 | 16 | 9.91 945 | 26 | 0.08 055 | 9.88 605 | 10 | 17 | 4 | 0.7 | 0.7 |
| 44 | 9.80 565 | 15 | 9.91 971 | 26 | 0.08 029 | 9.88 594 | 11 | 16 | 5 | 0.9 | 0.8 |
| | | 15 | | 25 | | | 10 | | 6 | 1.1 | 1.0 |
| 45 | 9.80 580 | | 9.91 996 | | 0.08 004 | 9.88 584 | | 15 | 7 | 1.3 | 1.2 |
| 46 | 9.80 595 | 15 | 9.92 022 | 26 | 0.07 978 | 9.88 573 | 11 | 14 | 8 | 1.5 | 1.3 |
| 47 | 9.80 610 | 15 | 9.92 048 | 26 | 0.07 952 | 9.88 563 | 10 | 13 | 9 | 1.6 | 1.5 |
| 48 | 9.80 625 | 15 | 9.92 073 | 25 | 0.07 927 | 9.88 552 | 11 | 12 | 10 | 1.8 | 1.7 |
| 49 | 9.80 641 | 16 | 9.92 099 | 26 | 0.07 901 | 9.88 542 | 10 | 11 | 20 | 3.7 | 3.3 |
| | | 15 | | 26 | | | 11 | | 30 | 5.5 | 5.0 |
| 50 | 9.80 656 | | 9.92 125 | | 0.07 875 | 9.88 531 | | 10 | 40 | 7.3 | 6.7 |
| 51 | 9.80 671 | 15 | 9.92 150 | 25 | 0.07 850 | 9.88 521 | 10 | 9 | 50 | 9.2 | 8.3 |
| 52 | 9.80 686 | 15 | 9.92 176 | 26 | 0.07 824 | 9.88 510 | 11 | 8 | " | 11 | 10 |
| 53 | 9.80 701 | 15 | 9.92 202 | 26 | 0.07 798 | 9.88 499 | 11 | 7 | 1 | 1.2 | 1.1 |
| 54 | 9.80 716 | 15 | 9.92 227 | 25 | 0.07 773 | 9.88 489 | 10 | 6 | 2 | 3.5 | 3.4 |
| | | 15 | | 26 | | | 11 | | 3 | 5.9 | 5.7 |
| 55 | 9.80 731 | | 9.92 253 | | 0.07 747 | 9.88 478 | | 5 | 4 | 8.3 | 7.9 |
| 56 | 9.80 746 | 15 | 9.92 279 | 26 | 0.07 721 | 9.88 468 | 10 | 4 | 5 | 10.6 | 10.2 |
| 57 | 9.80 762 | 16 | 9.92 304 | 25 | 0.07 696 | 9.88 457 | 11 | 3 | 6 | 13.0 | 12.5 |
| 58 | 9.80 777 | 15 | 9.92 330 | 26 | 0.07 670 | 9.88 447 | 10 | 2 | 7 | 15.4 | 14.8 |
| 59 | 9.80 792 | 15 | 9.92 356 | 26 | 0.07 644 | 9.88 436 | 11 | 1 | 8 | 17.7 | 17.1 |
| | | 15 | | 25 | | | 11 | | 9 | 20.1 | 19.3 |
| 60 | 9.80 807 | | 9.92 381 | | 0.07 619 | 9.88 425 | | 0 | 10 | 22.5 | 21.6 |
| | | | | | | | | | 11 | 24.8 | 23.9 |
| ' | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | ' | P. P. | | |

129° (309°)

81

(230°) 50°

LOGARITHMS OF THE FUNCTIONS (Continued)

40° (220°)

(319°) 139°

| ' | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | ' | P. P. | | |
|----|----------|----|----------|------|----------|----------|----|----|-------|------|------|
| 0 | 9.80 807 | 15 | 9.92 381 | 26 | 0.07 619 | 9.88 425 | 10 | 60 | " | 26 | 25 |
| 1 | 9.80 822 | 15 | 9.92 407 | 26 | 0.07 593 | 9.88 415 | 11 | 59 | 1 | 0.4 | 0.4 |
| 2 | 9.80 837 | 15 | 9.92 433 | 26 | 0.07 567 | 9.88 404 | 11 | 58 | 2 | 0.9 | 0.8 |
| 3 | 9.80 852 | 15 | 9.92 458 | 25 | 0.07 542 | 9.88 394 | 10 | 57 | 3 | 1.3 | 1.2 |
| 4 | 9.80 867 | 15 | 9.92 484 | 26 | 0.07 516 | 9.88 383 | 11 | 56 | 4 | 1.7 | 1.7 |
| 5 | 9.80 882 | 15 | 9.92 510 | 26 | 0.07 490 | 9.88 372 | 11 | 55 | 5 | 2.2 | 2.1 |
| 6 | 9.80 897 | 15 | 9.92 535 | 25 | 0.07 465 | 9.88 362 | 10 | 54 | 6 | 2.6 | 2.5 |
| 7 | 9.80 912 | 15 | 9.92 561 | 26 | 0.07 439 | 9.88 351 | 11 | 53 | 7 | 3.0 | 2.9 |
| 8 | 9.80 927 | 15 | 9.92 587 | 26 | 0.07 413 | 9.88 340 | 11 | 52 | 8 | 3.5 | 3.3 |
| 9 | 9.80 942 | 15 | 9.92 612 | 25 | 0.07 388 | 9.88 330 | 10 | 51 | 9 | 3.9 | 3.8 |
| 10 | 9.80 957 | 15 | 9.92 638 | 26 | 0.07 362 | 9.88 319 | 11 | 50 | 10 | 4.3 | 4.2 |
| 11 | 9.80 972 | 15 | 9.92 663 | 25 | 0.07 337 | 9.88 308 | 11 | 49 | 20 | 8.7 | 8.3 |
| 12 | 9.80 987 | 15 | 9.92 689 | 26 | 0.07 311 | 9.88 298 | 10 | 48 | 30 | 13.0 | 12.5 |
| 13 | 9.81 002 | 15 | 9.92 715 | 26 | 0.07 285 | 9.88 287 | 11 | 47 | 40 | 17.3 | 16.7 |
| 14 | 9.81 017 | 15 | 9.92 740 | 25 | 0.07 260 | 9.88 276 | 11 | 46 | 50 | 21.7 | 20.8 |
| 15 | 9.81 032 | 15 | 9.92 766 | 26 | 0.07 234 | 9.88 266 | 10 | 45 | " | 15 | 14 |
| 16 | 9.81 047 | 14 | 9.92 792 | 26 | 0.07 208 | 9.88 255 | 11 | 44 | 1 | 0.2 | 0.2 |
| 17 | 9.81 061 | 15 | 9.92 817 | 25 | 0.07 183 | 9.88 244 | 11 | 43 | 2 | 0.5 | 0.5 |
| 18 | 9.81 076 | 15 | 9.92 843 | 26 | 0.07 157 | 9.88 234 | 10 | 42 | 3 | 0.8 | 0.7 |
| 19 | 9.81 091 | 15 | 9.92 868 | 25 | 0.07 132 | 9.88 223 | 11 | 41 | 4 | 1.0 | 0.9 |
| 20 | 9.81 106 | 15 | 9.92 894 | 26 | 0.07 106 | 9.88 212 | 11 | 40 | 5 | 1.2 | 1.2 |
| 21 | 9.81 121 | 15 | 9.92 920 | 26 | 0.07 080 | 9.88 201 | 11 | 39 | 6 | 1.5 | 1.4 |
| 22 | 9.81 136 | 15 | 9.92 945 | 25 | 0.07 055 | 9.88 191 | 10 | 38 | 7 | 1.8 | 1.6 |
| 23 | 9.81 151 | 15 | 9.92 971 | 26 | 0.07 029 | 9.88 180 | 11 | 37 | 8 | 2.0 | 1.9 |
| 24 | 9.81 166 | 15 | 9.92 996 | 25 | 0.07 004 | 9.88 169 | 11 | 36 | 9 | 2.2 | 2.1 |
| 25 | 9.81 180 | 14 | 9.93 022 | 26 | 0.06 978 | 9.88 158 | 11 | 35 | 10 | 2.5 | 2.3 |
| 26 | 9.81 195 | 15 | 9.93 048 | 26 | 0.06 952 | 9.88 148 | 10 | 34 | 20 | 5.0 | 4.7 |
| 27 | 9.81 210 | 15 | 9.93 073 | 25 | 0.06 927 | 9.88 137 | 11 | 33 | 30 | 7.5 | 7.0 |
| 28 | 9.81 225 | 15 | 9.93 099 | 26 | 0.06 901 | 9.88 126 | 11 | 32 | 40 | 10.0 | 9.3 |
| 29 | 9.81 240 | 14 | 9.93 124 | 25 | 0.06 876 | 9.88 115 | 11 | 31 | 50 | 12.5 | 11.7 |
| 30 | 9.81 254 | 15 | 9.93 150 | 26 | 0.06 850 | 9.88 105 | 10 | 30 | " | 11 | 10 |
| 31 | 9.81 269 | 15 | 9.93 175 | 25 | 0.06 825 | 9.88 094 | 11 | 29 | 1 | 0.2 | 0.2 |
| 32 | 9.81 284 | 15 | 9.93 201 | 26 | 0.06 799 | 9.88 083 | 11 | 28 | 2 | 0.4 | 0.3 |
| 33 | 9.81 299 | 15 | 9.93 227 | 26 | 0.06 773 | 9.88 072 | 11 | 27 | 3 | 0.6 | 0.5 |
| 34 | 9.81 314 | 14 | 9.93 252 | 25 | 0.06 748 | 9.88 061 | 11 | 26 | 4 | 0.7 | 0.7 |
| 35 | 9.81 328 | 15 | 9.93 278 | 26 | 0.06 722 | 9.88 051 | 10 | 25 | 5 | 0.9 | 0.8 |
| 36 | 9.81 343 | 15 | 9.93 303 | 25 | 0.06 697 | 9.88 040 | 11 | 24 | 6 | 1.1 | 1.0 |
| 37 | 9.81 358 | 14 | 9.93 329 | 26 | 0.06 671 | 9.88 029 | 11 | 23 | 7 | 1.3 | 1.2 |
| 38 | 9.81 372 | 15 | 9.93 354 | 25 | 0.06 646 | 9.88 018 | 11 | 22 | 8 | 1.5 | 1.3 |
| 39 | 9.81 387 | 15 | 9.93 380 | 26 | 0.06 620 | 9.88 007 | 11 | 21 | 9 | 1.6 | 1.5 |
| 40 | 9.81 402 | 15 | 9.93 406 | 26 | 0.06 594 | 9.87 996 | 11 | 20 | 10 | 1.8 | 1.7 |
| 41 | 9.81 417 | 15 | 9.93 431 | 25 | 0.06 569 | 9.87 985 | 11 | 19 | 20 | 3.7 | 3.3 |
| 42 | 9.81 431 | 14 | 9.93 457 | 26 | 0.06 543 | 9.87 975 | 10 | 18 | 30 | 5.5 | 5.0 |
| 43 | 9.81 446 | 15 | 9.93 482 | 25 | 0.06 518 | 9.87 964 | 11 | 17 | 40 | 7.3 | 6.7 |
| 44 | 9.81 461 | 14 | 9.93 508 | 26 | 0.06 492 | 9.87 953 | 11 | 16 | 50 | 9.2 | 8.3 |
| 45 | 9.81 475 | 15 | 9.93 533 | 25 | 0.06 467 | 9.87 942 | 11 | 15 | | | |
| 46 | 9.81 490 | 15 | 9.93 559 | 26 | 0.06 441 | 9.87 931 | 11 | 14 | | | |
| 47 | 9.81 505 | 15 | 9.93 584 | 25 | 0.06 416 | 9.87 920 | 11 | 13 | 11 | 10 | 10 |
| 48 | 9.81 519 | 14 | 9.93 610 | 26 | 0.06 390 | 9.87 909 | 11 | 12 | 26 | 26 | 25 |
| 49 | 9.81 534 | 15 | 9.93 636 | 26 | 0.06 364 | 9.87 898 | 11 | 11 | 0 | 1.2 | 1.3 |
| 50 | 9.81 549 | 15 | 9.93 661 | 25 | 0.06 339 | 9.87 887 | 11 | 10 | 1 | 3.5 | 3.9 |
| 51 | 9.81 563 | 14 | 9.93 687 | 26 | 0.06 313 | 9.87 877 | 10 | 9 | 2 | 5.9 | 6.5 |
| 52 | 9.81 578 | 15 | 9.93 712 | 25 | 0.06 288 | 9.87 866 | 11 | 8 | 3 | 8.3 | 9.1 |
| 53 | 9.81 592 | 14 | 9.93 738 | 26 | 0.06 262 | 9.87 855 | 11 | 7 | 4 | 10.6 | 11.7 |
| 54 | 9.81 607 | 15 | 9.93 763 | 25 | 0.06 237 | 9.87 844 | 11 | 6 | 5 | 13.0 | 14.3 |
| 55 | 9.81 622 | 15 | 9.93 789 | 26 | 0.06 211 | 9.87 833 | 11 | 5 | 6 | 15.4 | 16.9 |
| 56 | 9.81 636 | 14 | 9.93 814 | 25 | 0.06 186 | 9.87 822 | 11 | 4 | 7 | 17.7 | 19.5 |
| 57 | 9.81 651 | 15 | 9.93 840 | 26 | 0.06 160 | 9.87 811 | 11 | 3 | 8 | 20.1 | 22.1 |
| 58 | 9.81 665 | 14 | 9.93 865 | 25 | 0.06 135 | 9.87 800 | 11 | 2 | 9 | 22.5 | 24.7 |
| 59 | 9.81 680 | 15 | 9.93 891 | 26 | 0.06 109 | 9.87 789 | 11 | 1 | 10 | 24.8 | — |
| 60 | 9.81 694 | 14 | 9.93 916 | 25 | 0.06 084 | 9.87 778 | 11 | 0 | 11 | — | — |
| ' | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | ' | P. P. | | |

130° (310°)

(229°) 49°

LOGARITHMS OF THE FUNCTIONS (Continued)

41° (221°)

(318°) 138°

| ' | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | ' | P. P. | | |
|----|----------|----|----------|------|----------|----------|----|----|-------|------|------|
| 0 | 9.81 694 | 15 | 9.93 916 | 26 | 0.06 084 | 9.87 778 | 11 | 60 | " | 26 | 25 |
| 1 | 9.81 709 | 14 | 9.93 942 | 25 | 0.06 058 | 9.87 767 | 11 | 59 | 1 | 0.4 | 0.4 |
| 2 | 9.81 723 | 15 | 9.93 967 | 26 | 0.06 033 | 9.87 756 | 11 | 58 | 2 | 0.9 | 0.8 |
| 3 | 9.81 738 | 14 | 9.93 993 | 25 | 0.06 007 | 9.87 745 | 11 | 57 | 3 | 1.3 | 1.2 |
| 4 | 9.81 752 | 15 | 9.94 018 | 26 | 0.05 982 | 9.87 734 | 11 | 56 | 4 | 1.7 | 1.7 |
| 5 | 9.81 767 | 14 | 9.94 044 | 25 | 0.05 956 | 9.87 723 | 11 | 55 | 5 | 2.2 | 2.1 |
| 6 | 9.81 781 | 15 | 9.94 069 | 26 | 0.05 931 | 9.87 712 | 11 | 54 | 6 | 2.6 | 2.5 |
| 7 | 9.81 796 | 14 | 9.94 095 | 25 | 0.05 905 | 9.87 701 | 11 | 53 | 7 | 3.0 | 2.9 |
| 8 | 9.81 810 | 15 | 9.94 120 | 26 | 0.05 880 | 9.87 690 | 11 | 52 | 8 | 3.5 | 3.3 |
| 9 | 9.81 825 | 14 | 9.94 146 | 25 | 0.05 854 | 9.87 679 | 11 | 51 | 9 | 3.9 | 3.8 |
| 10 | 9.81 839 | 15 | 9.94 171 | 26 | 0.05 829 | 9.87 668 | 11 | 50 | 10 | 4.3 | 4.2 |
| 11 | 9.81 854 | 14 | 9.94 197 | 25 | 0.05 803 | 9.87 657 | 11 | 49 | 20 | 8.7 | 8.3 |
| 12 | 9.81 868 | 15 | 9.94 222 | 26 | 0.05 778 | 9.87 646 | 11 | 48 | 30 | 13.0 | 12.5 |
| 13 | 9.81 883 | 14 | 9.94 248 | 25 | 0.05 752 | 9.87 635 | 11 | 47 | 40 | 17.3 | 16.7 |
| 14 | 9.81 897 | 15 | 9.94 273 | 26 | 0.05 727 | 9.87 624 | 11 | 46 | 50 | 21.7 | 20.8 |
| 15 | 9.81 911 | 14 | 9.94 299 | 25 | 0.05 701 | 9.87 613 | 12 | 45 | " | 15 | 14 |
| 16 | 9.81 926 | 15 | 9.94 324 | 26 | 0.05 676 | 9.87 601 | 12 | 44 | 1 | 0.2 | 0.2 |
| 17 | 9.81 940 | 14 | 9.94 350 | 25 | 0.05 650 | 9.87 590 | 11 | 43 | 2 | 0.5 | 0.5 |
| 18 | 9.81 955 | 15 | 9.94 375 | 26 | 0.05 625 | 9.87 579 | 11 | 42 | 3 | 0.8 | 0.7 |
| 19 | 9.81 969 | 14 | 9.94 401 | 25 | 0.05 599 | 9.87 568 | 11 | 41 | 4 | 1.0 | 0.9 |
| 20 | 9.81 983 | 15 | 9.94 426 | 26 | 0.05 574 | 9.87 557 | 11 | 40 | 5 | 1.2 | 1.2 |
| 21 | 9.81 998 | 14 | 9.94 452 | 25 | 0.05 548 | 9.87 546 | 11 | 39 | 6 | 1.5 | 1.4 |
| 22 | 9.82 012 | 15 | 9.94 477 | 26 | 0.05 523 | 9.87 535 | 11 | 38 | 7 | 1.8 | 1.6 |
| 23 | 9.82 026 | 14 | 9.94 503 | 25 | 0.05 497 | 9.87 524 | 11 | 37 | 8 | 2.0 | 1.9 |
| 24 | 9.82 041 | 15 | 9.94 528 | 26 | 0.05 472 | 9.87 513 | 11 | 36 | 9 | 2.2 | 2.1 |
| 25 | 9.82 055 | 14 | 9.94 554 | 25 | 0.05 446 | 9.87 501 | 12 | 35 | 10 | 2.5 | 2.3 |
| 26 | 9.82 069 | 15 | 9.94 579 | 26 | 0.05 421 | 9.87 490 | 11 | 34 | 20 | 5.0 | 4.7 |
| 27 | 9.82 084 | 14 | 9.94 604 | 25 | 0.05 396 | 9.87 479 | 11 | 33 | 30 | 7.5 | 7.0 |
| 28 | 9.82 098 | 15 | 9.94 630 | 26 | 0.05 370 | 9.87 468 | 11 | 32 | 40 | 10.0 | 9.3 |
| 29 | 9.82 112 | 14 | 9.94 655 | 25 | 0.05 345 | 9.87 457 | 11 | 31 | 50 | 12.5 | 11.7 |
| 30 | 9.82 126 | 15 | 9.94 681 | 26 | 0.05 319 | 9.87 446 | 12 | 30 | " | 11 | 11 |
| 31 | 9.82 141 | 14 | 9.94 706 | 25 | 0.05 294 | 9.87 434 | 12 | 29 | 1 | 0.2 | 0.2 |
| 32 | 9.82 155 | 15 | 9.94 732 | 26 | 0.05 268 | 9.87 423 | 11 | 28 | 2 | 0.4 | 0.4 |
| 33 | 9.82 169 | 14 | 9.94 757 | 25 | 0.05 243 | 9.87 412 | 11 | 27 | 3 | 0.6 | 0.6 |
| 34 | 9.82 184 | 15 | 9.94 783 | 26 | 0.05 217 | 9.87 401 | 11 | 26 | 4 | 0.8 | 0.7 |
| 35 | 9.82 198 | 14 | 9.94 808 | 25 | 0.05 192 | 9.87 390 | 12 | 25 | 5 | 1.0 | 0.9 |
| 36 | 9.82 212 | 15 | 9.94 834 | 26 | 0.05 166 | 9.87 378 | 12 | 24 | 6 | 1.2 | 1.1 |
| 37 | 9.82 226 | 14 | 9.94 859 | 25 | 0.05 141 | 9.87 367 | 11 | 23 | 7 | 1.4 | 1.3 |
| 38 | 9.82 240 | 15 | 9.94 884 | 26 | 0.05 116 | 9.87 356 | 11 | 22 | 8 | 1.6 | 1.5 |
| 39 | 9.82 255 | 14 | 9.94 910 | 25 | 0.05 090 | 9.87 345 | 11 | 21 | 9 | 1.8 | 1.6 |
| 40 | 9.82 269 | 15 | 9.94 935 | 26 | 0.05 065 | 9.87 334 | 12 | 20 | 10 | 2.0 | 1.8 |
| 41 | 9.82 283 | 14 | 9.94 961 | 25 | 0.05 039 | 9.87 322 | 12 | 19 | 20 | 4.0 | 3.7 |
| 42 | 9.82 297 | 15 | 9.94 986 | 26 | 0.05 014 | 9.87 311 | 11 | 18 | 30 | 6.0 | 5.5 |
| 43 | 9.82 311 | 14 | 9.95 012 | 25 | 0.04 988 | 9.87 300 | 11 | 17 | 40 | 8.0 | 7.3 |
| 44 | 9.82 326 | 15 | 9.95 037 | 26 | 0.04 963 | 9.87 288 | 12 | 16 | 50 | 10.0 | 9.2 |
| 45 | 9.82 340 | 14 | 9.95 062 | 25 | 0.04 938 | 9.87 277 | 11 | 15 | | | |
| 46 | 9.82 354 | 15 | 9.95 088 | 26 | 0.04 912 | 9.87 266 | 11 | 14 | | 12 | 12 |
| 47 | 9.82 368 | 14 | 9.95 113 | 25 | 0.04 887 | 9.87 255 | 11 | 13 | | 26 | 25 |
| 48 | 9.82 382 | 15 | 9.95 139 | 26 | 0.04 861 | 9.87 243 | 12 | 12 | | | |
| 49 | 9.82 396 | 14 | 9.95 164 | 25 | 0.04 836 | 9.87 232 | 11 | 11 | 0 | 1.1 | 1.1 |
| 50 | 9.82 410 | 15 | 9.95 190 | 26 | 0.04 810 | 9.87 221 | 12 | 10 | 1 | 3.2 | 3.1 |
| 51 | 9.82 424 | 14 | 9.95 215 | 25 | 0.04 785 | 9.87 209 | 12 | 9 | 2 | 5.4 | 5.2 |
| 52 | 9.82 439 | 15 | 9.95 240 | 26 | 0.04 760 | 9.87 198 | 11 | 8 | 3 | 7.6 | 7.3 |
| 53 | 9.82 453 | 14 | 9.95 266 | 25 | 0.04 734 | 9.87 187 | 11 | 7 | 4 | 9.8 | 9.4 |
| 54 | 9.82 467 | 15 | 9.95 291 | 26 | 0.04 709 | 9.87 175 | 12 | 6 | 5 | 11.9 | 11.5 |
| 55 | 9.82 481 | 14 | 9.95 317 | 25 | 0.04 683 | 9.87 164 | 11 | 5 | 6 | 14.1 | 13.5 |
| 56 | 9.82 495 | 15 | 9.95 342 | 26 | 0.04 658 | 9.87 153 | 11 | 4 | 7 | 16.2 | 15.6 |
| 57 | 9.82 509 | 14 | 9.95 368 | 25 | 0.04 632 | 9.87 141 | 12 | 3 | 8 | 18.4 | 17.7 |
| 58 | 9.82 523 | 15 | 9.95 393 | 26 | 0.04 607 | 9.87 130 | 11 | 2 | 9 | 20.6 | 19.8 |
| 59 | 9.82 537 | 14 | 9.95 418 | 25 | 0.04 582 | 9.87 119 | 11 | 1 | 10 | 22.8 | 21.9 |
| 60 | 9.82 551 | 15 | 9.95 444 | 26 | 0.04 556 | 9.87 107 | 12 | 0 | 11 | 24.9 | 23.9 |
| | | | | | | | | | 12 | | |
| | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | | P. P. | | |

131° (311°)

(228°) 48°

LOGARITHMS OF THE FUNCTIONS (Continued)

42° (222°)

(317°) 137°

| ' | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | ' | P. P. |
|----|----------|----|----------|------|----------|----------|----|----|--------------|
| 0 | 9.82 551 | | 9.95 444 | | 0.04 556 | 9.87 107 | | 60 | " 26 25 |
| 1 | 9.82 565 | 14 | 9.95 469 | 25 | 0.04 531 | 9.87 096 | 11 | 59 | 1 0.4 0.4 |
| 2 | 9.82 579 | 14 | 9.95 495 | 26 | 0.04 505 | 9.87 085 | 11 | 58 | 2 0.9 0.8 |
| 3 | 9.82 593 | 14 | 9.95 520 | 25 | 0.04 480 | 9.87 073 | 12 | 57 | 3 1.3 1.2 |
| 4 | 9.82 607 | 14 | 9.95 545 | 25 | 0.04 455 | 9.87 062 | 11 | 56 | 4 1.7 1.7 |
| 5 | 9.82 621 | 14 | 9.95 571 | 26 | 0.04 429 | 9.87 050 | 12 | 55 | 5 2.2 2.1 |
| 6 | 9.82 635 | 14 | 9.95 596 | 25 | 0.04 404 | 9.87 039 | 11 | 54 | 6 2.6 2.5 |
| 7 | 9.82 649 | 14 | 9.95 622 | 26 | 0.04 378 | 9.87 028 | 11 | 53 | 7 3.0 2.9 |
| 8 | 9.82 663 | 14 | 9.95 647 | 25 | 0.04 353 | 9.87 016 | 12 | 52 | 8 3.5 3.3 |
| 9 | 9.82 677 | 14 | 9.95 672 | 25 | 0.04 328 | 9.87 005 | 11 | 51 | 9 3.9 3.8 |
| 10 | 9.82 691 | 14 | 9.95 698 | 26 | 0.04 302 | 9.86 993 | 12 | 50 | 10 4.3 4.2 |
| 11 | 9.82 705 | 14 | 9.95 723 | 25 | 0.04 277 | 9.86 982 | 11 | 49 | 20 8.7 8.3 |
| 12 | 9.82 719 | 14 | 9.95 748 | 25 | 0.04 252 | 9.86 970 | 12 | 48 | 30 13.0 12.5 |
| 13 | 9.82 733 | 14 | 9.95 774 | 26 | 0.04 226 | 9.86 959 | 11 | 47 | 40 17.3 16.7 |
| 14 | 9.82 747 | 14 | 9.95 799 | 25 | 0.04 201 | 9.86 947 | 12 | 46 | 50 21.7 20.8 |
| 15 | 9.82 761 | 14 | 9.95 825 | 26 | 0.04 175 | 9.86 936 | 11 | 45 | " 14 13 |
| 16 | 9.82 775 | 14 | 9.95 850 | 25 | 0.04 150 | 9.86 924 | 12 | 44 | 1 0.2 0.2 |
| 17 | 9.82 788 | 13 | 9.95 875 | 25 | 0.04 125 | 9.86 913 | 11 | 43 | 2 0.5 0.4 |
| 18 | 9.82 802 | 14 | 9.95 901 | 26 | 0.04 099 | 9.86 902 | 12 | 42 | 3 0.7 0.6 |
| 19 | 9.82 816 | 14 | 9.95 926 | 25 | 0.04 074 | 9.86 890 | 12 | 41 | 4 0.9 0.9 |
| 20 | 9.82 830 | 14 | 9.95 952 | 26 | 0.04 048 | 9.86 879 | 11 | 40 | 5 1.2 1.1 |
| 21 | 9.82 844 | 14 | 9.95 977 | 25 | 0.04 023 | 9.86 867 | 12 | 39 | 6 1.4 1.3 |
| 22 | 9.82 858 | 14 | 9.96 002 | 25 | 0.03 998 | 9.86 855 | 12 | 38 | 7 1.6 1.5 |
| 23 | 9.82 872 | 14 | 9.96 028 | 26 | 0.03 972 | 9.86 844 | 11 | 37 | 8 1.9 1.7 |
| 24 | 9.82 885 | 13 | 9.96 053 | 25 | 0.03 947 | 9.86 832 | 12 | 36 | 9 2.1 2.0 |
| 25 | 9.82 899 | 14 | 9.96 078 | 25 | 0.03 922 | 9.86 821 | 11 | 35 | 10 2.3 2.2 |
| 26 | 9.82 913 | 14 | 9.96 104 | 26 | 0.03 896 | 9.86 809 | 12 | 34 | 20 4.7 4.3 |
| 27 | 9.82 927 | 14 | 9.96 129 | 25 | 0.03 871 | 9.86 798 | 11 | 33 | 30 7.0 6.5 |
| 28 | 9.82 941 | 14 | 9.96 155 | 26 | 0.03 845 | 9.86 786 | 12 | 32 | 40 9.3 8.7 |
| 29 | 9.82 955 | 14 | 9.96 180 | 25 | 0.03 820 | 9.86 775 | 11 | 31 | 50 11.7 10.8 |
| 30 | 9.82 968 | 13 | 9.96 205 | 25 | 0.03 795 | 9.86 763 | 12 | 30 | " 12 11 |
| 31 | 9.82 982 | 14 | 9.96 231 | 26 | 0.03 769 | 9.86 752 | 11 | 29 | 1 0.2 0.2 |
| 32 | 9.82 996 | 14 | 9.96 256 | 25 | 0.03 744 | 9.86 740 | 12 | 28 | 2 0.4 0.4 |
| 33 | 9.83 010 | 14 | 9.96 281 | 25 | 0.03 719 | 9.86 728 | 12 | 27 | 3 0.6 0.6 |
| 34 | 9.83 023 | 13 | 9.96 307 | 26 | 0.03 693 | 9.86 717 | 11 | 26 | 4 0.8 0.7 |
| 35 | 9.83 037 | 14 | 9.96 332 | 25 | 0.03 668 | 9.86 705 | 12 | 25 | 5 1.0 0.9 |
| 36 | 9.83 051 | 14 | 9.96 357 | 26 | 0.03 643 | 9.86 694 | 11 | 24 | 6 1.2 1.1 |
| 37 | 9.83 065 | 14 | 9.96 383 | 25 | 0.03 617 | 9.86 682 | 12 | 23 | 7 1.4 1.3 |
| 38 | 9.83 078 | 13 | 9.96 408 | 25 | 0.03 592 | 9.86 670 | 12 | 22 | 8 1.6 1.5 |
| 39 | 9.83 092 | 14 | 9.96 433 | 26 | 0.03 567 | 9.86 659 | 11 | 21 | 9 1.8 1.6 |
| 40 | 9.83 106 | 14 | 9.96 459 | 25 | 0.03 541 | 9.86 647 | 12 | 20 | 10 2.0 1.8 |
| 41 | 9.83 120 | 14 | 9.96 484 | 26 | 0.03 516 | 9.86 635 | 12 | 19 | 20 4.0 3.7 |
| 42 | 9.83 133 | 13 | 9.96 510 | 26 | 0.03 490 | 9.86 624 | 11 | 18 | 30 6.0 5.5 |
| 43 | 9.83 147 | 14 | 9.96 535 | 25 | 0.03 465 | 9.86 612 | 12 | 17 | 40 8.0 7.3 |
| 44 | 9.83 161 | 14 | 9.96 560 | 25 | 0.03 440 | 9.86 600 | 12 | 16 | 50 10.0 9.2 |
| 45 | 9.83 174 | 13 | 9.96 586 | 26 | 0.03 414 | 9.86 589 | 11 | 15 | |
| 46 | 9.83 188 | 14 | 9.96 611 | 25 | 0.03 389 | 9.86 577 | 12 | 14 | |
| 47 | 9.83 202 | 14 | 9.96 636 | 26 | 0.03 364 | 9.86 565 | 12 | 13 | |
| 48 | 9.83 215 | 13 | 9.96 662 | 25 | 0.03 338 | 9.86 554 | 11 | 12 | |
| 49 | 9.83 229 | 14 | 9.96 687 | 26 | 0.03 313 | 9.86 542 | 12 | 11 | |
| 50 | 9.83 242 | 14 | 9.96 712 | 25 | 0.03 288 | 9.86 530 | 12 | 10 | |
| 51 | 9.83 256 | 14 | 9.96 738 | 26 | 0.03 262 | 9.86 518 | 12 | 9 | |
| 52 | 9.83 270 | 14 | 9.96 763 | 25 | 0.03 237 | 9.86 507 | 11 | 8 | |
| 53 | 9.83 283 | 13 | 9.96 788 | 25 | 0.03 212 | 9.86 495 | 12 | 7 | |
| 54 | 9.83 297 | 14 | 9.96 814 | 26 | 0.03 186 | 9.86 483 | 12 | 6 | |
| 55 | 9.83 310 | 13 | 9.96 839 | 25 | 0.03 161 | 9.86 472 | 11 | 5 | |
| 56 | 9.83 324 | 14 | 9.96 864 | 25 | 0.03 136 | 9.86 460 | 12 | 4 | |
| 57 | 9.83 338 | 14 | 9.96 890 | 26 | 0.03 110 | 9.86 448 | 12 | 3 | |
| 58 | 9.83 351 | 13 | 9.96 915 | 25 | 0.03 085 | 9.86 436 | 12 | 2 | |
| 59 | 9.83 365 | 14 | 9.96 940 | 25 | 0.03 060 | 9.86 425 | 11 | 1 | |
| 60 | 9.83 378 | 13 | 9.96 966 | 26 | 0.03 034 | 9.86 413 | 12 | 0 | |
| ' | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | ' | P. P. |

132° (312°)

(227°) 47°

LOGARITHMS OF THE FUNCTIONS (Continued)

43° (223°)

(316°) 136°

| ' | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | ' | P. P. | | |
|----|----------|----|----------|------|----------|----------|----|----|-------|------|------|
| 0 | 9.83 378 | | 9.96 966 | | 0.03 034 | 9.86 413 | | 60 | " | 26 | 25 |
| 1 | 9.83 392 | 14 | 9.96 991 | 25 | 0.03 009 | 9.86 401 | 12 | 59 | 1 | 0.4 | 0.4 |
| 2 | 9.83 405 | 13 | 9.97 016 | 25 | 0.02 984 | 9.86 389 | 12 | 58 | 2 | 0.9 | 0.8 |
| 3 | 9.83 419 | 14 | 9.97 042 | 26 | 0.02 958 | 9.86 377 | 12 | 57 | 3 | 1.3 | 1.2 |
| 4 | 9.83 432 | 13 | 9.97 067 | 25 | 0.02 933 | 9.86 366 | 11 | 56 | 4 | 1.7 | 1.7 |
| 5 | 9.83 446 | 14 | 9.97 092 | 25 | 0.02 908 | 9.86 354 | 12 | 55 | 5 | 2.2 | 2.1 |
| 6 | 9.83 459 | 13 | 9.97 118 | 26 | 0.02 882 | 9.86 342 | 12 | 54 | 6 | 2.6 | 2.5 |
| 7 | 9.83 473 | 14 | 9.97 143 | 25 | 0.02 857 | 9.86 330 | 12 | 53 | 7 | 3.0 | 2.9 |
| 8 | 9.83 486 | 13 | 9.97 168 | 25 | 0.02 832 | 9.86 318 | 12 | 52 | 8 | 3.5 | 3.3 |
| 9 | 9.83 500 | 14 | 9.97 193 | 25 | 0.02 807 | 9.86 306 | 12 | 51 | 9 | 3.9 | 3.8 |
| 10 | 9.83 513 | 13 | 9.97 219 | 26 | 0.02 781 | 9.86 295 | 11 | 50 | 10 | 4.3 | 4.2 |
| 11 | 9.83 527 | 14 | 9.97 244 | 25 | 0.02 756 | 9.86 283 | 12 | 49 | 20 | 8.7 | 8.3 |
| 12 | 9.83 540 | 13 | 9.97 269 | 25 | 0.02 731 | 9.86 271 | 12 | 48 | 30 | 13.0 | 12.5 |
| 13 | 9.83 554 | 14 | 9.97 295 | 26 | 0.02 705 | 9.86 259 | 12 | 47 | 40 | 17.3 | 16.7 |
| 14 | 9.83 567 | 13 | 9.97 320 | 25 | 0.02 680 | 9.86 247 | 12 | 46 | 50 | 21.7 | 20.8 |
| 15 | 9.83 581 | 14 | 9.97 345 | 25 | 0.02 655 | 9.86 235 | 12 | 45 | " | 14 | 13 |
| 16 | 9.83 594 | 13 | 9.97 371 | 26 | 0.02 629 | 9.86 223 | 12 | 44 | 1 | 0.2 | 0.2 |
| 17 | 9.83 608 | 14 | 9.97 396 | 25 | 0.02 604 | 9.86 211 | 12 | 43 | 2 | 0.5 | 0.4 |
| 18 | 9.83 621 | 13 | 9.97 421 | 25 | 0.02 579 | 9.86 200 | 11 | 42 | 3 | 0.7 | 0.6 |
| 19 | 9.83 634 | 14 | 9.97 447 | 26 | 0.02 553 | 9.86 188 | 12 | 41 | 4 | 0.9 | 0.9 |
| 20 | 9.83 648 | 13 | 9.97 472 | 25 | 0.02 528 | 9.86 176 | 12 | 40 | 5 | 1.2 | 1.1 |
| 21 | 9.83 661 | 14 | 9.97 497 | 26 | 0.02 503 | 9.86 164 | 12 | 39 | 6 | 1.4 | 1.3 |
| 22 | 9.83 674 | 13 | 9.97 523 | 25 | 0.02 477 | 9.86 152 | 12 | 38 | 7 | 1.6 | 1.5 |
| 23 | 9.83 688 | 14 | 9.97 548 | 25 | 0.02 452 | 9.86 140 | 12 | 37 | 8 | 1.9 | 1.7 |
| 24 | 9.83 701 | 13 | 9.97 573 | 25 | 0.02 427 | 9.86 128 | 12 | 36 | 9 | 2.1 | 2.0 |
| 25 | 9.83 715 | 14 | 9.97 598 | 26 | 0.02 402 | 9.86 116 | 12 | 35 | 10 | 2.3 | 2.2 |
| 26 | 9.83 728 | 13 | 9.97 624 | 25 | 0.02 376 | 9.86 104 | 12 | 34 | 20 | 4.7 | 4.3 |
| 27 | 9.83 741 | 14 | 9.97 649 | 25 | 0.02 351 | 9.86 092 | 12 | 33 | 30 | 7.0 | 6.5 |
| 28 | 9.83 755 | 13 | 9.97 674 | 25 | 0.02 326 | 9.86 080 | 12 | 32 | 40 | 9.3 | 8.7 |
| 29 | 9.83 768 | 14 | 9.97 700 | 26 | 0.02 300 | 9.86 068 | 12 | 31 | 50 | 11.7 | 10.8 |
| 30 | 9.83 781 | 13 | 9.97 725 | 25 | 0.02 275 | 9.86 056 | 12 | 30 | " | 12 | 11 |
| 31 | 9.83 795 | 14 | 9.97 750 | 25 | 0.02 250 | 9.86 044 | 12 | 29 | 1 | 0.2 | 0.2 |
| 32 | 9.83 808 | 13 | 9.97 776 | 26 | 0.02 224 | 9.86 032 | 12 | 28 | 2 | 0.4 | 0.4 |
| 33 | 9.83 821 | 14 | 9.97 801 | 25 | 0.02 199 | 9.86 020 | 12 | 27 | 3 | 0.6 | 0.6 |
| 34 | 9.83 834 | 13 | 9.97 826 | 25 | 0.02 174 | 9.86 008 | 12 | 26 | 4 | 0.8 | 0.7 |
| 35 | 9.83 848 | 14 | 9.97 851 | 25 | 0.02 149 | 9.85 996 | 12 | 25 | 5 | 1.0 | 0.9 |
| 36 | 9.83 861 | 13 | 9.97 877 | 26 | 0.02 123 | 9.85 984 | 12 | 24 | 6 | 1.2 | 1.1 |
| 37 | 9.83 874 | 14 | 9.97 902 | 25 | 0.02 098 | 9.85 972 | 12 | 23 | 7 | 1.4 | 1.3 |
| 38 | 9.83 887 | 13 | 9.97 927 | 25 | 0.02 073 | 9.85 960 | 12 | 22 | 8 | 1.6 | 1.5 |
| 39 | 9.83 901 | 14 | 9.97 953 | 26 | 0.02 047 | 9.85 948 | 12 | 21 | 9 | 1.8 | 1.6 |
| 40 | 9.83 914 | 13 | 9.97 978 | 25 | 0.02 022 | 9.85 936 | 12 | 20 | 10 | 2.0 | 1.8 |
| 41 | 9.83 927 | 14 | 9.98 003 | 25 | 0.01 997 | 9.85 924 | 12 | 19 | 20 | 4.0 | 3.7 |
| 42 | 9.83 940 | 13 | 9.98 029 | 26 | 0.01 971 | 9.85 912 | 12 | 18 | 30 | 6.0 | 5.5 |
| 43 | 9.83 954 | 14 | 9.98 054 | 25 | 0.01 946 | 9.85 900 | 12 | 17 | 40 | 8.0 | 7.3 |
| 44 | 9.83 967 | 13 | 9.98 079 | 25 | 0.01 921 | 9.85 888 | 12 | 16 | 50 | 10.0 | 9.2 |
| 45 | 9.83 980 | 14 | 9.98 104 | 25 | 0.01 896 | 9.85 876 | 12 | 15 | 13 | 13 | 12 |
| 46 | 9.83 993 | 13 | 9.98 130 | 26 | 0.01 870 | 9.85 864 | 12 | 14 | 26 | 25 | 25 |
| 47 | 9.84 006 | 14 | 9.98 155 | 25 | 0.01 845 | 9.85 851 | 13 | 13 | 0 | 1.0 | 0.9 |
| 48 | 9.84 020 | 13 | 9.98 180 | 26 | 0.01 820 | 9.85 839 | 12 | 12 | 1 | 3.0 | 2.9 |
| 49 | 9.84 033 | 14 | 9.98 206 | 25 | 0.01 794 | 9.85 827 | 12 | 11 | 2 | 5.0 | 4.8 |
| 50 | 9.84 046 | 13 | 9.98 231 | 25 | 0.01 769 | 9.85 815 | 12 | 10 | 3 | 7.0 | 6.7 |
| 51 | 9.84 059 | 14 | 9.98 256 | 25 | 0.01 744 | 9.85 803 | 12 | 9 | 4 | 9.0 | 8.7 |
| 52 | 9.84 072 | 13 | 9.98 281 | 25 | 0.01 719 | 9.85 791 | 12 | 8 | 5 | 11.0 | 10.6 |
| 53 | 9.84 085 | 14 | 9.98 307 | 26 | 0.01 693 | 9.85 779 | 12 | 7 | 6 | 13.0 | 12.5 |
| 54 | 9.84 098 | 13 | 9.98 332 | 25 | 0.01 668 | 9.85 766 | 13 | 6 | 7 | 15.0 | 14.4 |
| 55 | 9.84 112 | 14 | 9.98 357 | 25 | 0.01 643 | 9.85 754 | 12 | 5 | 8 | 17.0 | 16.3 |
| 56 | 9.84 125 | 13 | 9.98 383 | 26 | 0.01 617 | 9.85 742 | 12 | 4 | 9 | 19.0 | 18.3 |
| 57 | 9.84 138 | 14 | 9.98 408 | 25 | 0.01 592 | 9.85 730 | 12 | 3 | 10 | 21.0 | 20.2 |
| 58 | 9.84 151 | 13 | 9.98 433 | 25 | 0.01 567 | 9.85 718 | 12 | 2 | 11 | 23.0 | 22.1 |
| 59 | 9.84 164 | 14 | 9.98 458 | 26 | 0.01 542 | 9.85 706 | 13 | 1 | 12 | 25.0 | 24.1 |
| 60 | 9.84 177 | 13 | 9.98 484 | 25 | 0.01 516 | 9.85 693 | 12 | 0 | 13 | | |
| ' | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | ' | P. P. | | |

133° (313°)

(226°) 46°

LOGARITHMS OF THE FUNCTIONS (Continued)

44° (224°)

(315°) 135°

| ' | L. Sin. | d. | L. Tan. | c.d. | L. Cot. | L. Cos. | d. | ' | P. P. |
|----|----------|----|----------|------|----------|----------|----|----|-------------------|
| 0 | 9.84 177 | | 9.98 484 | | 0.01 516 | 9.85 693 | | 60 | " 26 25 |
| 1 | 9.84 190 | 13 | 9.98 509 | 25 | 0.01 491 | 9.85 681 | 12 | 59 | 1 0.4 0.4 |
| 2 | 9.84 203 | 13 | 9.98 534 | 25 | 0.01 466 | 9.85 669 | 12 | 58 | 2 0.9 0.8 |
| 3 | 9.84 216 | 13 | 9.98 560 | 26 | 0.01 440 | 9.85 657 | 12 | 57 | 3 1.3 1.2 |
| 4 | 9.84 229 | 13 | 9.98 585 | 25 | 0.01 415 | 9.85 645 | 12 | 56 | 4 1.7 1.7 |
| 5 | 9.84 242 | 13 | 9.98 610 | 25 | 0.01 390 | 9.85 632 | 13 | 55 | 5 2.2 2.1 |
| 6 | 9.84 255 | 13 | 9.98 635 | 25 | 0.01 365 | 9.85 620 | 12 | 54 | 6 2.6 2.5 |
| 7 | 9.84 269 | 14 | 9.98 661 | 26 | 0.01 339 | 9.85 608 | 12 | 53 | 7 3.0 2.9 |
| 8 | 9.84 282 | 13 | 9.98 686 | 25 | 0.01 314 | 9.85 596 | 12 | 52 | 8 3.5 3.3 |
| 9 | 9.84 295 | 13 | 9.98 711 | 25 | 0.01 289 | 9.85 583 | 13 | 51 | 9 3.9 3.8 |
| 10 | 9.84 308 | 13 | 9.98 737 | 26 | 0.01 263 | 9.85 571 | 12 | 50 | 10 4.3 4.2 |
| 11 | 9.84 321 | 13 | 9.98 762 | 25 | 0.01 238 | 9.85 559 | 12 | 49 | 20 8.7 8.3 |
| 12 | 9.84 334 | 13 | 9.98 787 | 25 | 0.01 213 | 9.85 547 | 12 | 48 | 30 13.0 12.5 |
| 13 | 9.84 347 | 13 | 9.98 812 | 25 | 0.01 188 | 9.85 534 | 13 | 47 | 40 17.3 16.7 |
| 14 | 9.84 360 | 13 | 9.98 838 | 26 | 0.01 162 | 9.85 522 | 12 | 46 | 50 21.7 20.8 |
| 15 | 9.84 373 | 13 | 9.98 863 | 25 | 0.01 137 | 9.85 510 | 12 | 45 | " 14 13 12 |
| 16 | 9.84 385 | 12 | 9.98 888 | 25 | 0.01 112 | 9.85 497 | 13 | 44 | 1 0.2 0.2 0.2 |
| 17 | 9.84 398 | 13 | 9.98 913 | 25 | 0.01 087 | 9.85 485 | 12 | 43 | 2 0.5 0.4 0.4 |
| 18 | 9.84 411 | 13 | 9.98 939 | 26 | 0.01 061 | 9.85 473 | 12 | 42 | 3 0.7 0.6 0.6 |
| 19 | 9.84 424 | 13 | 9.98 964 | 25 | 0.01 036 | 9.85 460 | 13 | 41 | 4 0.9 0.9 0.8 |
| 20 | 9.84 437 | 13 | 9.98 989 | 26 | 0.01 011 | 9.85 448 | 12 | 40 | 5 1.2 1.1 1.6 |
| 21 | 9.84 450 | 13 | 9.99 015 | 25 | 0.00 985 | 9.85 436 | 12 | 39 | 6 1.4 1.3 1.2 |
| 22 | 9.84 463 | 13 | 9.99 040 | 25 | 0.00 960 | 9.85 423 | 13 | 38 | 7 1.6 1.5 1.4 |
| 23 | 9.84 476 | 13 | 9.99 065 | 25 | 0.00 935 | 9.85 411 | 12 | 37 | 8 1.9 1.7 1.6 |
| 24 | 9.84 489 | 13 | 9.99 090 | 25 | 0.00 910 | 9.85 399 | 12 | 36 | 9 2.1 2.0 1.8 |
| 25 | 9.84 502 | 13 | 9.99 116 | 26 | 0.00 884 | 9.85 386 | 13 | 35 | 10 2.3 2.2 2.0 |
| 26 | 9.84 515 | 13 | 9.99 141 | 25 | 0.00 859 | 9.85 374 | 12 | 34 | 20 4.7 4.3 4.0 |
| 27 | 9.84 528 | 13 | 9.99 166 | 25 | 0.00 834 | 9.85 361 | 13 | 33 | 30 7.0 6.5 6.0 |
| 28 | 9.84 540 | 12 | 9.99 191 | 25 | 0.00 809 | 9.85 349 | 12 | 32 | 40 9.3 8.7 8.0 |
| 29 | 9.84 553 | 13 | 9.99 217 | 26 | 0.00 783 | 9.85 337 | 12 | 31 | 50 11.7 10.8 10.0 |
| 30 | 9.84 566 | 13 | 9.99 242 | 25 | 0.00 758 | 9.85 324 | 13 | 30 | " 13 13 |
| 31 | 9.84 579 | 13 | 9.99 267 | 25 | 0.00 733 | 9.85 312 | 12 | 29 | 26 25 |
| 32 | 9.84 592 | 13 | 9.99 293 | 26 | 0.00 707 | 9.85 299 | 13 | 28 | |
| 33 | 9.84 605 | 13 | 9.99 318 | 25 | 0.00 682 | 9.85 287 | 12 | 27 | |
| 34 | 9.84 618 | 13 | 9.99 343 | 25 | 0.00 657 | 9.85 274 | 13 | 26 | |
| 35 | 9.84 630 | 12 | 9.99 368 | 25 | 0.00 632 | 9.85 262 | 12 | 25 | |
| 36 | 9.84 643 | 13 | 9.99 394 | 26 | 0.00 606 | 9.85 250 | 12 | 24 | |
| 37 | 9.84 656 | 13 | 9.99 419 | 25 | 0.00 581 | 9.85 237 | 13 | 23 | |
| 38 | 9.84 669 | 13 | 9.99 444 | 25 | 0.00 556 | 9.85 225 | 12 | 22 | |
| 39 | 9.84 682 | 12 | 9.99 469 | 25 | 0.00 531 | 9.85 212 | 13 | 21 | |
| 40 | 9.84 694 | 13 | 9.99 495 | 26 | 0.00 505 | 9.85 200 | 12 | 20 | |
| 41 | 9.84 707 | 13 | 9.99 520 | 25 | 0.00 480 | 9.85 187 | 13 | 19 | |
| 42 | 9.84 720 | 13 | 9.99 545 | 25 | 0.00 455 | 9.85 175 | 12 | 18 | |
| 43 | 9.84 733 | 13 | 9.99 570 | 25 | 0.00 430 | 9.85 162 | 13 | 17 | |
| 44 | 9.84 745 | 12 | 9.99 596 | 26 | 0.00 404 | 9.85 150 | 12 | 16 | |
| 45 | 9.84 758 | 13 | 9.99 621 | 25 | 0.00 379 | 9.85 137 | 13 | 15 | |
| 46 | 9.84 771 | 13 | 9.99 646 | 25 | 0.00 354 | 9.85 125 | 12 | 14 | |
| 47 | 9.84 784 | 13 | 9.99 672 | 26 | 0.00 328 | 9.85 112 | 13 | 13 | |
| 48 | 9.84 796 | 12 | 9.99 697 | 25 | 0.00 303 | 9.85 100 | 12 | 12 | |
| 49 | 9.84 809 | 13 | 9.99 722 | 25 | 0.00 278 | 9.85 087 | 13 | 11 | |
| 50 | 9.84 822 | 13 | 9.99 747 | 25 | 0.00 253 | 9.85 074 | 12 | 10 | |
| 51 | 9.84 835 | 12 | 9.99 773 | 26 | 0.00 227 | 9.85 062 | 12 | 9 | |
| 52 | 9.84 847 | 12 | 9.99 798 | 25 | 0.00 202 | 9.85 049 | 13 | 8 | |
| 53 | 9.84 860 | 13 | 9.99 823 | 25 | 0.00 177 | 9.85 037 | 12 | 7 | |
| 54 | 9.84 873 | 13 | 9.99 848 | 25 | 0.00 152 | 9.85 024 | 13 | 6 | |
| 55 | 9.84 885 | 12 | 9.99 874 | 26 | 0.00 126 | 9.85 012 | 12 | 5 | |
| 56 | 9.84 898 | 13 | 9.99 899 | 25 | 0.00 101 | 9.84 999 | 13 | 4 | |
| 57 | 9.84 911 | 13 | 9.99 924 | 25 | 0.00 076 | 9.84 986 | 12 | 3 | |
| 58 | 9.84 923 | 12 | 9.99 949 | 26 | 0.00 051 | 9.84 974 | 13 | 2 | |
| 59 | 9.84 936 | 13 | 9.99 975 | 25 | 0.00 025 | 9.84 961 | 12 | 1 | |
| 60 | 9.84 949 | 13 | 0.00 000 | 25 | 0.00 000 | 9.84 949 | 12 | 0 | |
| ' | L. Cos. | d. | L. Cot. | c.d. | L. Tan. | L. Sin. | d. | ' | P. P. |

184° (314°)

(225°) 45°

NATURAL TRIGONOMETRIC FUNCTIONS

Values of the trigonometric functions of angles for each minute from 0-360°.

For degrees indicated at the top of the page use the column headings at the top. For degrees indicated at the bottom use the column indications at the bottom.

With degrees at the left of each block (top or bottom), use the minute column at the left and with degrees at the right of each block use the minute column at the right.

NATURAL FUNCTIONS (Continued)

0° (180°)

(359°) 179°

1° (181°)

(358°) 178°

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .00000 | .00000 | | 1.0000 | 60 |
| 1 | .00029 | .00029 | 3437.7 | 1.0000 | 59 |
| 2 | .00058 | .00058 | 1718.9 | 1.0000 | 58 |
| 3 | .00087 | .00087 | 1145.9 | 1.0000 | 57 |
| 4 | .00116 | .00116 | 859.44 | 1.0000 | 56 |
| 5 | .00145 | .00145 | 687.55 | 1.0000 | 55 |
| 6 | .00175 | .00175 | 572.96 | 1.0000 | 54 |
| 7 | .00204 | .00204 | 491.11 | 1.0000 | 53 |
| 8 | .00233 | .00233 | 429.72 | 1.0000 | 52 |
| 9 | .00262 | .00262 | 381.97 | 1.0000 | 51 |
| 10 | .00291 | .00291 | 343.77 | 1.0000 | 50 |
| 11 | .00320 | .00320 | 312.52 | .99999 | 49 |
| 12 | .00349 | .00349 | 286.48 | .99999 | 48 |
| 13 | .00378 | .00378 | 264.44 | .99999 | 47 |
| 14 | .00407 | .00407 | 245.55 | .99999 | 46 |
| 15 | .00436 | .00436 | 229.18 | .99999 | 45 |
| 16 | .00465 | .00465 | 214.86 | .99999 | 44 |
| 17 | .00495 | .00495 | 202.22 | .99999 | 43 |
| 18 | .00524 | .00524 | 190.98 | .99999 | 42 |
| 19 | .00553 | .00553 | 180.93 | .99998 | 41 |
| 20 | .00582 | .00582 | 171.89 | .99998 | 40 |
| 21 | .00611 | .00611 | 163.70 | .99998 | 39 |
| 22 | .00640 | .00640 | 156.26 | .99998 | 38 |
| 23 | .00669 | .00669 | 149.47 | .99998 | 37 |
| 24 | .00698 | .00698 | 143.24 | .99998 | 36 |
| 25 | .00727 | .00727 | 137.51 | .99997 | 35 |
| 26 | .00756 | .00756 | 132.22 | .99997 | 34 |
| 27 | .00785 | .00785 | 127.32 | .99997 | 33 |
| 28 | .00814 | .00815 | 122.77 | .99997 | 32 |
| 29 | .00844 | .00844 | 118.54 | .99996 | 31 |
| 30 | .00873 | .00873 | 114.59 | .99996 | 30 |
| 31 | .00902 | .00902 | 110.89 | .99996 | 29 |
| 32 | .00931 | .00931 | 107.43 | .99996 | 28 |
| 33 | .00960 | .00960 | 104.17 | .99995 | 27 |
| 34 | .00989 | .00989 | 101.11 | .99995 | 26 |
| 35 | .01018 | .01018 | 98.218 | .99995 | 25 |
| 36 | .01047 | .01047 | 95.489 | .99995 | 24 |
| 37 | .01076 | .01076 | 92.908 | .99994 | 23 |
| 38 | .01105 | .01105 | 90.463 | .99994 | 22 |
| 39 | .01134 | .01135 | 88.144 | .99994 | 21 |
| 40 | .01164 | .01164 | 85.940 | .99993 | 20 |
| 41 | .01193 | .01193 | 83.844 | .99993 | 19 |
| 42 | .01222 | .01222 | 81.847 | .99993 | 18 |
| 43 | .01251 | .01251 | 79.943 | .99992 | 17 |
| 44 | .01280 | .01280 | 78.126 | .99992 | 16 |
| 45 | .01309 | .01309 | 76.390 | .99991 | 15 |
| 46 | .01338 | .01338 | 74.729 | .99991 | 14 |
| 47 | .01367 | .01367 | 73.139 | .99991 | 13 |
| 48 | .01396 | .01396 | 71.615 | .99990 | 12 |
| 49 | .01425 | .01425 | 70.153 | .99990 | 11 |
| 50 | .01454 | .01455 | 68.750 | .99989 | 10 |
| 51 | .01483 | .01484 | 67.402 | .99989 | 9 |
| 52 | .01513 | .01513 | 66.105 | .99989 | 8 |
| 53 | .01542 | .01542 | 64.858 | .99988 | 7 |
| 54 | .01571 | .01571 | 63.657 | .99988 | 6 |
| 55 | .01600 | .01600 | 62.499 | .99987 | 5 |
| 56 | .01629 | .01629 | 61.383 | .99987 | 4 |
| 57 | .01658 | .01658 | 60.306 | .99986 | 3 |
| 58 | .01687 | .01687 | 59.266 | .99986 | 2 |
| 59 | .01716 | .01716 | 58.261 | .99985 | 1 |
| 60 | .01745 | .01746 | 57.290 | .99985 | 0 |
| " | Cos | Cot | Tan | Sin | " |

90° (270°)

(269°) 89°

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .01745 | .01746 | 57.290 | .99985 | 60 |
| 1 | .01774 | .01775 | 56.351 | .99984 | 59 |
| 2 | .01803 | .01804 | 55.442 | .99984 | 58 |
| 3 | .01832 | .01833 | 54.561 | .99983 | 57 |
| 4 | .01862 | .01862 | 53.709 | .99983 | 56 |
| 5 | .01891 | .01891 | 52.882 | .99982 | 55 |
| 6 | .01920 | .01920 | 52.081 | .99982 | 54 |
| 7 | .01949 | .01949 | 51.303 | .99981 | 53 |
| 8 | .01978 | .01978 | 50.549 | .99980 | 52 |
| 9 | .02007 | .02007 | 49.816 | .99980 | 51 |
| 10 | .02036 | .02036 | 49.104 | .99979 | 50 |
| 11 | .02065 | .02066 | 48.412 | .99979 | 49 |
| 12 | .02094 | .02095 | 47.740 | .99978 | 48 |
| 13 | .02123 | .02124 | 47.085 | .99977 | 47 |
| 14 | .02152 | .02153 | 46.449 | .99977 | 46 |
| 15 | .02181 | .02182 | 45.829 | .99976 | 45 |
| 16 | .02211 | .02211 | 45.226 | .99976 | 44 |
| 17 | .02240 | .02240 | 44.639 | .99975 | 43 |
| 18 | .02269 | .02269 | 44.066 | .99974 | 42 |
| 19 | .02298 | .02298 | 43.508 | .99974 | 41 |
| 20 | .02327 | .02328 | 42.964 | .99973 | 40 |
| 21 | .02356 | .02357 | 42.433 | .99972 | 39 |
| 22 | .02385 | .02386 | 41.916 | .99972 | 38 |
| 23 | .02414 | .02415 | 41.411 | .99971 | 37 |
| 24 | .02443 | .02444 | 40.917 | .99970 | 36 |
| 25 | .02472 | .02473 | 40.436 | .99969 | 35 |
| 26 | .02501 | .02502 | 39.965 | .99969 | 34 |
| 27 | .02530 | .02531 | 39.506 | .99968 | 33 |
| 28 | .02560 | .02560 | 39.057 | .99967 | 32 |
| 29 | .02589 | .02589 | 38.618 | .99966 | 31 |
| 30 | .02618 | .02619 | 38.188 | .99966 | 30 |
| 31 | .02647 | .02648 | 37.769 | .99965 | 29 |
| 32 | .02676 | .02677 | 37.358 | .99964 | 28 |
| 33 | .02705 | .02706 | 36.956 | .99963 | 27 |
| 34 | .02734 | .02735 | 36.563 | .99963 | 26 |
| 35 | .02763 | .02764 | 36.178 | .99962 | 25 |
| 36 | .02792 | .02793 | 35.801 | .99961 | 24 |
| 37 | .02821 | .02822 | 35.431 | .99960 | 23 |
| 38 | .02850 | .02851 | 35.070 | .99959 | 22 |
| 39 | .02879 | .02881 | 34.715 | .99959 | 21 |
| 40 | .02908 | .02910 | 34.368 | .99958 | 20 |
| 41 | .02938 | .02939 | 34.027 | .99957 | 19 |
| 42 | .02967 | .02968 | 33.694 | .99956 | 18 |
| 43 | .02996 | .02997 | 33.366 | .99955 | 17 |
| 44 | .03025 | .03026 | 33.045 | .99954 | 16 |
| 45 | .03054 | .03055 | 32.730 | .99953 | 15 |
| 46 | .03083 | .03084 | 32.421 | .99952 | 14 |
| 47 | .03112 | .03114 | 32.118 | .99952 | 13 |
| 48 | .03141 | .03143 | 31.821 | .99951 | 12 |
| 49 | .03170 | .03172 | 31.528 | .99950 | 11 |
| 50 | .03199 | .03201 | 31.242 | .99949 | 10 |
| 51 | .03228 | .03230 | 30.960 | .99948 | 9 |
| 52 | .03257 | .03259 | 30.683 | .99947 | 8 |
| 53 | .03286 | .03288 | 30.412 | .99946 | 7 |
| 54 | .03316 | .03317 | 30.145 | .99945 | 6 |
| 55 | .03345 | .03346 | 29.882 | .99944 | 5 |
| 56 | .03374 | .03376 | 29.624 | .99943 | 4 |
| 57 | .03403 | .03405 | 29.371 | .99942 | 3 |
| 58 | .03432 | .03434 | 29.122 | .99941 | 2 |
| 59 | .03461 | .03463 | 28.877 | .99940 | 1 |
| 60 | .03490 | .03492 | 28.636 | .99939 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

91° (271°)

(268°) 88°

NATURAL FUNCTIONS (Continued)

2° (182°)

(357°) 177°

3° (183°)

(356°) 176°

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .03490 | .03492 | 28.636 | .99939 | 60 |
| 1 | .03519 | .03521 | 28.399 | .99938 | 59 |
| 2 | .03548 | .03550 | 28.166 | .99937 | 58 |
| 3 | .03577 | .03579 | 27.937 | .99936 | 57 |
| 4 | .03606 | .03609 | 27.712 | .99935 | 56 |
| 5 | .03635 | .03638 | 27.490 | .99934 | 55 |
| 6 | .03664 | .03667 | 27.271 | .99933 | 54 |
| 7 | .03693 | .03696 | 27.057 | .99932 | 53 |
| 8 | .03723 | .03725 | 26.845 | .99931 | 52 |
| 9 | .03752 | .03754 | 26.637 | .99930 | 51 |
| 10 | .03781 | .03783 | 26.432 | .99929 | 50 |
| 11 | .03810 | .03812 | 26.230 | .99927 | 49 |
| 12 | .03839 | .03842 | 26.031 | .99926 | 48 |
| 13 | .03868 | .03871 | 25.835 | .99925 | 47 |
| 14 | .03897 | .03900 | 25.642 | .99924 | 46 |
| 15 | .03926 | .03929 | 25.452 | .99923 | 45 |
| 16 | .03955 | .03958 | 25.264 | .99922 | 44 |
| 17 | .03984 | .03987 | 25.080 | .99921 | 43 |
| 18 | .04013 | .04016 | 24.898 | .99919 | 42 |
| 19 | .04042 | .04046 | 24.719 | .99918 | 41 |
| 20 | .04071 | .04075 | 24.542 | .99917 | 40 |
| 21 | .04100 | .04104 | 24.368 | .99916 | 39 |
| 22 | .04129 | .04133 | 24.196 | .99915 | 38 |
| 23 | .04159 | .04162 | 24.026 | .99913 | 37 |
| 24 | .04188 | .04191 | 23.859 | .99912 | 36 |
| 25 | .04217 | .04220 | 23.695 | .99911 | 35 |
| 26 | .04246 | .04250 | 23.532 | .99910 | 34 |
| 27 | .04275 | .04279 | 23.372 | .99909 | 33 |
| 28 | .04304 | .04308 | 23.214 | .99907 | 32 |
| 29 | .04333 | .04337 | 23.058 | .99906 | 31 |
| 30 | .04362 | .04366 | 22.904 | .99905 | 30 |
| 31 | .04391 | .04395 | 22.752 | .99904 | 29 |
| 32 | .04420 | .04424 | 22.602 | .99902 | 28 |
| 33 | .04449 | .04454 | 22.454 | .99901 | 27 |
| 34 | .04478 | .04483 | 22.308 | .99900 | 26 |
| 35 | .04507 | .04512 | 22.164 | .99898 | 25 |
| 36 | .04536 | .04541 | 22.022 | .99897 | 24 |
| 37 | .04565 | .04570 | 21.881 | .99896 | 23 |
| 38 | .04594 | .04599 | 21.743 | .99894 | 22 |
| 39 | .04623 | .04628 | 21.606 | .99893 | 21 |
| 40 | .04653 | .04658 | 21.470 | .99892 | 20 |
| 41 | .04682 | .04687 | 21.337 | .99890 | 19 |
| 42 | .04711 | .04716 | 21.205 | .99889 | 18 |
| 43 | .04740 | .04745 | 21.075 | .99888 | 17 |
| 44 | .04769 | .04774 | 20.946 | .99886 | 16 |
| 45 | .04798 | .04803 | 20.819 | .99885 | 15 |
| 46 | .04827 | .04833 | 20.693 | .99883 | 14 |
| 47 | .04856 | .04862 | 20.569 | .99882 | 13 |
| 48 | .04885 | .04891 | 20.446 | .99881 | 12 |
| 49 | .04914 | .04920 | 20.325 | .99879 | 11 |
| 50 | .04943 | .04949 | 20.206 | .99878 | 10 |
| 51 | .04972 | .04978 | 20.087 | .99876 | 9 |
| 52 | .05001 | .05007 | 19.970 | .99875 | 8 |
| 53 | .05030 | .05037 | 19.855 | .99873 | 7 |
| 54 | .05059 | .05066 | 19.740 | .99872 | 6 |
| 55 | .05088 | .05095 | 19.627 | .99870 | 5 |
| 56 | .05117 | .05124 | 19.516 | .99869 | 4 |
| 57 | .05146 | .05153 | 19.405 | .99867 | 3 |
| 58 | .05175 | .05182 | 19.296 | .99866 | 2 |
| 59 | .05205 | .05212 | 19.188 | .99864 | 1 |
| 60 | .05234 | .05241 | 19.081 | .99863 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

92° (272°)

(267°) 87°

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .05234 | .05241 | 19.081 | .99863 | 60 |
| 1 | .05263 | .05270 | 18.976 | .99861 | 59 |
| 2 | .05292 | .05299 | 18.871 | .99860 | 58 |
| 3 | .05321 | .05328 | 18.768 | .99858 | 57 |
| 4 | .05350 | .05357 | 18.666 | .99857 | 56 |
| 5 | .05379 | .05387 | 18.564 | .99855 | 55 |
| 6 | .05408 | .05416 | 18.464 | .99854 | 54 |
| 7 | .05437 | .05445 | 18.366 | .99852 | 53 |
| 8 | .05466 | .05474 | 18.268 | .99851 | 52 |
| 9 | .05495 | .05503 | 18.171 | .99849 | 51 |
| 10 | .05524 | .05533 | 18.075 | .99847 | 50 |
| 11 | .05553 | .05562 | 17.980 | .99846 | 49 |
| 12 | .05582 | .05591 | 17.886 | .99844 | 48 |
| 13 | .05611 | .05620 | 17.793 | .99842 | 47 |
| 14 | .05640 | .05649 | 17.702 | .99841 | 46 |
| 15 | .05669 | .05678 | 17.611 | .99839 | 45 |
| 16 | .05698 | .05708 | 17.521 | .99838 | 44 |
| 17 | .05727 | .05737 | 17.431 | .99836 | 43 |
| 18 | .05756 | .05766 | 17.343 | .99834 | 42 |
| 19 | .05785 | .05795 | 17.256 | .99833 | 41 |
| 20 | .05814 | .05824 | 17.169 | .99831 | 40 |
| 21 | .05844 | .05854 | 17.084 | .99829 | 39 |
| 22 | .05873 | .05883 | 16.999 | .99827 | 38 |
| 23 | .05902 | .05912 | 16.915 | .99826 | 37 |
| 24 | .05931 | .05941 | 16.832 | .99824 | 36 |
| 25 | .05960 | .05970 | 16.750 | .99822 | 35 |
| 26 | .05989 | .05999 | 16.668 | .99821 | 34 |
| 27 | .06018 | .06029 | 16.587 | .99819 | 33 |
| 28 | .06047 | .06058 | 16.507 | .99817 | 32 |
| 29 | .06076 | .06087 | 16.428 | .99815 | 31 |
| 30 | .06105 | .06116 | 16.350 | .99813 | 30 |
| 31 | .06134 | .06145 | 16.272 | .99812 | 29 |
| 32 | .06163 | .06175 | 16.195 | .99810 | 28 |
| 33 | .06192 | .06204 | 16.119 | .99808 | 27 |
| 34 | .06221 | .06233 | 16.043 | .99806 | 26 |
| 35 | .06250 | .06262 | 15.969 | .99804 | 25 |
| 36 | .06279 | .06291 | 15.895 | .99803 | 24 |
| 37 | .06308 | .06321 | 15.821 | .99801 | 23 |
| 38 | .06337 | .06350 | 15.748 | .99799 | 22 |
| 39 | .06366 | .06379 | 15.676 | .99797 | 21 |
| 40 | .06395 | .06408 | 15.605 | .99795 | 20 |
| 41 | .06424 | .06438 | 15.534 | .99793 | 19 |
| 42 | .06453 | .06467 | 15.464 | .99792 | 18 |
| 43 | .06482 | .06496 | 15.394 | .99790 | 17 |
| 44 | .06511 | .06525 | 15.325 | .99788 | 16 |
| 45 | .06540 | .06554 | 15.257 | .99786 | 15 |
| 46 | .06569 | .06584 | 15.189 | .99784 | 14 |
| 47 | .06598 | .06613 | 15.122 | .99782 | 13 |
| 48 | .06627 | .06642 | 15.056 | .99780 | 12 |
| 49 | .06656 | .06671 | 14.990 | .99778 | 11 |
| 50 | .06685 | .06700 | 14.924 | .99776 | 10 |
| 51 | .06714 | .06730 | 14.860 | .99774 | 9 |
| 52 | .06743 | .06759 | 14.795 | .99772 | 8 |
| 53 | .06773 | .06788 | 14.732 | .99770 | 7 |
| 54 | .06802 | .06817 | 14.669 | .99768 | 6 |
| 55 | .06831 | .06847 | 14.606 | .99766 | 5 |
| 56 | .06860 | .06876 | 14.544 | .99764 | 4 |
| 57 | .06889 | .06905 | 14.482 | .99762 | 3 |
| 58 | .06918 | .06934 | 14.421 | .99760 | 2 |
| 59 | .06947 | .06963 | 14.361 | .99758 | 1 |
| 60 | .06976 | .06993 | 14.301 | .99756 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

93° (273°)

(266°) 86°

NATURAL FUNCTIONS (Continued)

4° (184°)

(355°) 175°

5° (185°)

(354°) 174°

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .06976 | .06993 | 14.301 | .99756 | 60 |
| 1 | .07005 | .07022 | 14.241 | .99754 | 59 |
| 2 | .07034 | .07051 | 14.182 | .99752 | 58 |
| 3 | .07063 | .07080 | 14.124 | .99750 | 57 |
| 4 | .07092 | .07110 | 14.065 | .99748 | 56 |
| 5 | .07121 | .07139 | 14.008 | .99746 | 55 |
| 6 | .07150 | .07168 | 13.951 | .99744 | 54 |
| 7 | .07179 | .07197 | 13.894 | .99742 | 53 |
| 8 | .07208 | .07227 | 13.838 | .99740 | 52 |
| 9 | .07237 | .07256 | 13.782 | .99738 | 51 |
| 10 | .07266 | .07285 | 13.727 | .99736 | 50 |
| 11 | .07295 | .07314 | 13.672 | .99734 | 49 |
| 12 | .07324 | .07344 | 13.617 | .99731 | 48 |
| 13 | .07353 | .07373 | 13.563 | .99729 | 47 |
| 14 | .07382 | .07402 | 13.510 | .99727 | 46 |
| 15 | .07411 | .07431 | 13.457 | .99725 | 45 |
| 16 | .07440 | .07461 | 13.404 | .99723 | 44 |
| 17 | .07469 | .07490 | 13.352 | .99721 | 43 |
| 18 | .07498 | .07519 | 13.300 | .99719 | 42 |
| 19 | .07527 | .07548 | 13.248 | .99716 | 41 |
| 20 | .07556 | .07578 | 13.197 | .99714 | 40 |
| 21 | .07585 | .07607 | 13.146 | .99712 | 39 |
| 22 | .07614 | .07636 | 13.096 | .99710 | 38 |
| 23 | .07643 | .07665 | 13.046 | .99708 | 37 |
| 24 | .07672 | .07695 | 12.996 | .99705 | 36 |
| 25 | .07701 | .07724 | 12.947 | .99703 | 35 |
| 26 | .07730 | .07753 | 12.898 | .99701 | 34 |
| 27 | .07759 | .07782 | 12.850 | .99699 | 33 |
| 28 | .07788 | .07812 | 12.801 | .99696 | 32 |
| 29 | .07817 | .07841 | 12.754 | .99694 | 31 |
| 30 | .07846 | .07870 | 12.706 | .99692 | 30 |
| 31 | .07875 | .07899 | 12.659 | .99689 | 29 |
| 32 | .07904 | .07929 | 12.612 | .99687 | 28 |
| 33 | .07933 | .07958 | 12.566 | .99685 | 27 |
| 34 | .07962 | .07987 | 12.520 | .99683 | 26 |
| 35 | .07991 | .08017 | 12.474 | .99680 | 25 |
| 36 | .08020 | .08046 | 12.429 | .99678 | 24 |
| 37 | .08049 | .08075 | 12.384 | .99676 | 23 |
| 38 | .08078 | .08104 | 12.339 | .99673 | 22 |
| 39 | .08107 | .08134 | 12.295 | .99671 | 21 |
| 40 | .08136 | .08163 | 12.251 | .99668 | 20 |
| 41 | .08165 | .08192 | 12.207 | .99666 | 19 |
| 42 | .08194 | .08221 | 12.163 | .99664 | 18 |
| 43 | .08223 | .08251 | 12.120 | .99661 | 17 |
| 44 | .08252 | .08280 | 12.077 | .99659 | 16 |
| 45 | .08281 | .08309 | 12.035 | .99657 | 15 |
| 46 | .08310 | .08339 | 11.992 | .99654 | 14 |
| 47 | .08339 | .08368 | 11.950 | .99652 | 13 |
| 48 | .08368 | .08397 | 11.909 | .99649 | 12 |
| 49 | .08397 | .08427 | 11.867 | .99647 | 11 |
| 50 | .08426 | .08456 | 11.826 | .99644 | 10 |
| 51 | .08455 | .08485 | 11.785 | .99642 | 9 |
| 52 | .08484 | .08514 | 11.745 | .99639 | 8 |
| 53 | .08513 | .08544 | 11.705 | .99637 | 7 |
| 54 | .08542 | .08573 | 11.664 | .99635 | 6 |
| 55 | .08571 | .08602 | 11.625 | .99632 | 5 |
| 56 | .08600 | .08632 | 11.585 | .99630 | 4 |
| 57 | .08629 | .08661 | 11.546 | .99627 | 3 |
| 58 | .08658 | .08690 | 11.507 | .99625 | 2 |
| 59 | .08687 | .08720 | 11.468 | .99622 | 1 |
| 60 | .08716 | .08749 | 11.430 | .99619 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

94° (274°)

(265°) 85°

95° (275°)

(264°) 84°

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .08716 | .08749 | 11.430 | .99619 | 60 |
| 1 | .08745 | .08778 | 11.392 | .99617 | 59 |
| 2 | .08774 | .08807 | 11.354 | .99614 | 58 |
| 3 | .08803 | .08837 | 11.316 | .99612 | 57 |
| 4 | .08831 | .08866 | 11.279 | .99609 | 56 |
| 5 | .08860 | .08895 | 11.242 | .99607 | 55 |
| 6 | .08889 | .08925 | 11.205 | .99604 | 54 |
| 7 | .08918 | .08954 | 11.168 | .99602 | 53 |
| 8 | .08947 | .08983 | 11.132 | .99599 | 52 |
| 9 | .08976 | .09013 | 11.095 | .99596 | 51 |
| 10 | .09005 | .09042 | 11.059 | .99594 | 50 |
| 11 | .09034 | .09071 | 11.024 | .99591 | 49 |
| 12 | .09063 | .09101 | 10.988 | .99588 | 48 |
| 13 | .09092 | .09130 | 10.953 | .99586 | 47 |
| 14 | .09121 | .09159 | 10.918 | .99583 | 46 |
| 15 | .09150 | .09189 | 10.883 | .99580 | 45 |
| 16 | .09179 | .09218 | 10.848 | .99578 | 44 |
| 17 | .09208 | .09247 | 10.814 | .99575 | 43 |
| 18 | .09237 | .09277 | 10.780 | .99572 | 42 |
| 19 | .09266 | .09306 | 10.746 | .99570 | 41 |
| 20 | .09295 | .09335 | 10.712 | .99567 | 40 |
| 21 | .09324 | .09365 | 10.678 | .99564 | 39 |
| 22 | .09353 | .09394 | 10.645 | .99562 | 38 |
| 23 | .09382 | .09423 | 10.612 | .99559 | 37 |
| 24 | .09411 | .09453 | 10.579 | .99556 | 36 |
| 25 | .09440 | .09482 | 10.546 | .99553 | 35 |
| 26 | .09469 | .09511 | 10.514 | .99551 | 34 |
| 27 | .09498 | .09541 | 10.481 | .99548 | 33 |
| 28 | .09527 | .09570 | 10.449 | .99545 | 32 |
| 29 | .09556 | .09600 | 10.417 | .99542 | 31 |
| 30 | .09585 | .09629 | 10.385 | .99540 | 30 |
| 31 | .09614 | .09658 | 10.354 | .99537 | 29 |
| 32 | .09642 | .09688 | 10.322 | .99534 | 28 |
| 33 | .09671 | .09717 | 10.291 | .99531 | 27 |
| 34 | .09700 | .09746 | 10.260 | .99528 | 26 |
| 35 | .09729 | .09776 | 10.229 | .99526 | 25 |
| 36 | .09758 | .09805 | 10.199 | .99523 | 24 |
| 37 | .09787 | .09834 | 10.168 | .99520 | 23 |
| 38 | .09816 | .09864 | 10.138 | .99517 | 22 |
| 39 | .09845 | .09893 | 10.108 | .99514 | 21 |
| 40 | .09874 | .09923 | 10.078 | .99511 | 20 |
| 41 | .09903 | .09952 | 10.048 | .99508 | 19 |
| 42 | .09932 | .09981 | 10.019 | .99506 | 18 |
| 43 | .09961 | 1.0011 | 9.9893 | .99503 | 17 |
| 44 | .09990 | 1.0040 | 9.9601 | .99500 | 16 |
| 45 | 1.0019 | 1.0069 | 9.9310 | .99497 | 15 |
| 46 | 1.0048 | 1.0099 | 9.9021 | .99494 | 14 |
| 47 | 1.0077 | 1.0128 | 9.8734 | .99491 | 13 |
| 48 | 1.0106 | 1.0158 | 9.8448 | .99488 | 12 |
| 49 | 1.0135 | 1.0187 | 9.8164 | .99485 | 11 |
| 50 | 1.0164 | 1.0216 | 9.7882 | .99482 | 10 |
| 51 | 1.0192 | 1.0246 | 9.7601 | .99479 | 9 |
| 52 | 1.0221 | 1.0275 | 9.7322 | .99476 | 8 |
| 53 | 1.0250 | 1.0305 | 9.7044 | .99473 | 7 |
| 54 | 1.0279 | 1.0334 | 9.6768 | .99470 | 6 |
| 55 | 1.0308 | 1.0363 | 9.6493 | .99467 | 5 |
| 56 | 1.0337 | 1.0393 | 9.6220 | .99464 | 4 |
| 57 | 1.0366 | 1.0422 | 9.5949 | .99461 | 3 |
| 58 | 1.0395 | 1.0452 | 9.5679 | .99458 | 2 |
| 59 | 1.0424 | 1.0481 | 9.5411 | .99455 | 1 |
| 60 | 1.0453 | 1.0510 | 9.5144 | .99452 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

NATURAL FUNCTIONS (Continued)

6° (186°)

(353°) 173°

7° (187°)

(352°) 172°

| | Sin | Tan | Cot | Cos | |
|----|--------|--------|--------|--------|----|
| 0 | .10453 | .10510 | 9.5144 | .99452 | 60 |
| 1 | .10482 | .10540 | 9.4878 | .99449 | 59 |
| 2 | .10511 | .10569 | 9.4614 | .99446 | 58 |
| 3 | .10540 | .10599 | 9.4352 | .99443 | 57 |
| 4 | .10569 | .10628 | 9.4090 | .99440 | 56 |
| 5 | .10597 | .10657 | 9.3831 | .99437 | 55 |
| 6 | .10626 | .10687 | 9.3572 | .99434 | 54 |
| 7 | .10655 | .10716 | 9.3315 | .99431 | 53 |
| 8 | .10684 | .10746 | 9.3060 | .99428 | 52 |
| 9 | .10713 | .10775 | 9.2806 | .99424 | 51 |
| 10 | .10742 | .10805 | 9.2553 | .99421 | 50 |
| 11 | .10771 | .10834 | 9.2302 | .99418 | 49 |
| 12 | .10800 | .10863 | 9.2052 | .99415 | 48 |
| 13 | .10829 | .10893 | 9.1803 | .99412 | 47 |
| 14 | .10858 | .10922 | 9.1555 | .99409 | 46 |
| 15 | .10887 | .10952 | 9.1309 | .99406 | 45 |
| 16 | .10916 | .10981 | 9.1065 | .99402 | 44 |
| 17 | .10945 | .11011 | 9.0821 | .99399 | 43 |
| 18 | .10973 | .11040 | 9.0579 | .99396 | 42 |
| 19 | .11002 | .11070 | 9.0338 | .99393 | 41 |
| 20 | .11031 | .11099 | 9.0098 | .99390 | 40 |
| 21 | .11060 | .11128 | 8.9860 | .99386 | 39 |
| 22 | .11089 | .11158 | 8.9623 | .99383 | 38 |
| 23 | .11118 | .11187 | 8.9387 | .99380 | 37 |
| 24 | .11147 | .11217 | 8.9152 | .99377 | 36 |
| 25 | .11176 | .11246 | 8.8919 | .99374 | 35 |
| 26 | .11205 | .11276 | 8.8686 | .99370 | 34 |
| 27 | .11234 | .11305 | 8.8455 | .99367 | 33 |
| 28 | .11263 | .11335 | 8.8225 | .99364 | 32 |
| 29 | .11291 | .11364 | 8.7996 | .99360 | 31 |
| 30 | .11320 | .11394 | 8.7769 | .99357 | 30 |
| 31 | .11349 | .11423 | 8.7542 | .99354 | 29 |
| 32 | .11378 | .11452 | 8.7317 | .99351 | 28 |
| 33 | .11407 | .11482 | 8.7093 | .99347 | 27 |
| 34 | .11436 | .11511 | 8.6870 | .99344 | 26 |
| 35 | .11465 | .11541 | 8.6648 | .99341 | 25 |
| 36 | .11494 | .11570 | 8.6427 | .99337 | 24 |
| 37 | .11523 | .11600 | 8.6208 | .99334 | 23 |
| 38 | .11552 | .11629 | 8.5989 | .99331 | 22 |
| 39 | .11580 | .11659 | 8.5772 | .99327 | 21 |
| 40 | .11609 | .11688 | 8.5555 | .99324 | 20 |
| 41 | .11638 | .11718 | 8.5340 | .99320 | 19 |
| 42 | .11667 | .11747 | 8.5126 | .99317 | 18 |
| 43 | .11696 | .11777 | 8.4913 | .99314 | 17 |
| 44 | .11725 | .11806 | 8.4701 | .99310 | 16 |
| 45 | .11754 | .11836 | 8.4490 | .99307 | 15 |
| 46 | .11783 | .11865 | 8.4280 | .99303 | 14 |
| 47 | .11812 | .11895 | 8.4071 | .99300 | 13 |
| 48 | .11840 | .11924 | 8.3863 | .99297 | 12 |
| 49 | .11869 | .11954 | 8.3656 | .99293 | 11 |
| 50 | .11898 | .11983 | 8.3450 | .99290 | 10 |
| 51 | .11927 | .12013 | 8.3245 | .99286 | 9 |
| 52 | .11956 | .12042 | 8.3041 | .99283 | 8 |
| 53 | .11985 | .12072 | 8.2838 | .99279 | 7 |
| 54 | .12014 | .12101 | 8.2636 | .99276 | 6 |
| 55 | .12043 | .12131 | 8.2434 | .99272 | 5 |
| 56 | .12071 | .12160 | 8.2234 | .99269 | 4 |
| 57 | .12100 | .12190 | 8.2035 | .99265 | 3 |
| 58 | .12129 | .12219 | 8.1837 | .99262 | 2 |
| 59 | .12158 | .12249 | 8.1640 | .99258 | 1 |
| 60 | .12187 | .12278 | 8.1443 | .99255 | 0 |
| | Cos | Cot | Tan | Sin | |

| | Sin | Tan | Cot | Cos | |
|----|--------|--------|--------|--------|----|
| 0 | .12187 | .12278 | 8.1443 | .99255 | 60 |
| 1 | .12216 | .12308 | 8.1248 | .99251 | 59 |
| 2 | .12245 | .12338 | 8.1054 | .99248 | 58 |
| 3 | .12274 | .12367 | 8.0860 | .99244 | 57 |
| 4 | .12302 | .12397 | 8.0667 | .99240 | 56 |
| 5 | .12331 | .12426 | 8.0476 | .99237 | 55 |
| 6 | .12360 | .12456 | 8.0285 | .99233 | 54 |
| 7 | .12389 | .12485 | 8.0095 | .99230 | 53 |
| 8 | .12418 | .12515 | 7.9906 | .99226 | 52 |
| 9 | .12447 | .12544 | 7.9718 | .99222 | 51 |
| 10 | .12476 | .12574 | 7.9530 | .99219 | 50 |
| 11 | .12504 | .12603 | 7.9344 | .99215 | 49 |
| 12 | .12533 | .12633 | 7.9158 | .99211 | 48 |
| 13 | .12562 | .12662 | 7.8973 | .99208 | 47 |
| 14 | .12591 | .12692 | 7.8789 | .99204 | 46 |
| 15 | .12620 | .12722 | 7.8606 | .99200 | 45 |
| 16 | .12649 | .12751 | 7.8424 | .99197 | 44 |
| 17 | .12678 | .12781 | 7.8243 | .99193 | 43 |
| 18 | .12706 | .12810 | 7.8062 | .99189 | 42 |
| 19 | .12735 | .12840 | 7.7882 | .99186 | 41 |
| 20 | .12764 | .12869 | 7.7704 | .99182 | 40 |
| 21 | .12793 | .12899 | 7.7525 | .99178 | 39 |
| 22 | .12822 | .12929 | 7.7348 | .99175 | 38 |
| 23 | .12851 | .12958 | 7.7171 | .99171 | 37 |
| 24 | .12880 | .12988 | 7.6996 | .99167 | 36 |
| 25 | .12908 | .13017 | 7.6821 | .99163 | 35 |
| 26 | .12937 | .13047 | 7.6647 | .99160 | 34 |
| 27 | .12966 | .13076 | 7.6473 | .99156 | 33 |
| 28 | .12995 | .13106 | 7.6301 | .99152 | 32 |
| 29 | .13024 | .13136 | 7.6129 | .99148 | 31 |
| 30 | .13053 | .13165 | 7.5958 | .99144 | 30 |
| 31 | .13081 | .13195 | 7.5787 | .99141 | 29 |
| 32 | .13110 | .13224 | 7.5618 | .99137 | 28 |
| 33 | .13139 | .13254 | 7.5449 | .99133 | 27 |
| 34 | .13168 | .13284 | 7.5281 | .99129 | 26 |
| 35 | .13197 | .13313 | 7.5113 | .99125 | 25 |
| 36 | .13226 | .13343 | 7.4947 | .99122 | 24 |
| 37 | .13254 | .13372 | 7.4781 | .99118 | 23 |
| 38 | .13283 | .13402 | 7.4615 | .99114 | 22 |
| 39 | .13312 | .13432 | 7.4451 | .99110 | 21 |
| 40 | .13341 | .13461 | 7.4287 | .99106 | 20 |
| 41 | .13370 | .13491 | 7.4124 | .99102 | 19 |
| 42 | .13399 | .13521 | 7.3962 | .99098 | 18 |
| 43 | .13427 | .13550 | 7.3800 | .99094 | 17 |
| 44 | .13456 | .13580 | 7.3639 | .99091 | 16 |
| 45 | .13485 | .13609 | 7.3479 | .99087 | 15 |
| 46 | .13514 | .13639 | 7.3319 | .99083 | 14 |
| 47 | .13543 | .13669 | 7.3160 | .99079 | 13 |
| 48 | .13572 | .13698 | 7.3002 | .99075 | 12 |
| 49 | .13600 | .13728 | 7.2844 | .99071 | 11 |
| 50 | .13629 | .13758 | 7.2687 | .99067 | 10 |
| 51 | .13658 | .13787 | 7.2531 | .99063 | 9 |
| 52 | .13687 | .13817 | 7.2375 | .99059 | 8 |
| 53 | .13716 | .13846 | 7.2220 | .99055 | 7 |
| 54 | .13744 | .13876 | 7.2066 | .99051 | 6 |
| 55 | .13773 | .13906 | 7.1912 | .99047 | 5 |
| 56 | .13802 | .13935 | 7.1759 | .99043 | 4 |
| 57 | .13831 | .13965 | 7.1607 | .99039 | 3 |
| 58 | .13860 | .13995 | 7.1455 | .99035 | 2 |
| 59 | .13889 | .14024 | 7.1304 | .99031 | 1 |
| 60 | .13917 | .14054 | 7.1154 | .99027 | 0 |
| | Cos | Cot | Tan | Sin | |

96° (276°)

(263°) 83°

97° (277°)

(262°) 82°

NATURAL FUNCTIONS (Continued)

8° (188°)

(351°) 171°

9° (189°)

(350°) 170°

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .13917 | .14054 | 7.1154 | .99027 | 60 |
| 1 | .13946 | .14084 | 7.1004 | .99023 | 59 |
| 2 | .13975 | .14113 | 7.0855 | .99019 | 58 |
| 3 | .14004 | .14143 | 7.0706 | .99015 | 57 |
| 4 | .14033 | .14173 | 7.0558 | .99011 | 56 |
| 5 | .14061 | .14202 | 7.0410 | .99006 | 55 |
| 6 | .14090 | .14232 | 7.0264 | .99002 | 54 |
| 7 | .14119 | .14262 | 7.0117 | .98998 | 53 |
| 8 | .14148 | .14291 | 6.9972 | .98994 | 52 |
| 9 | .14177 | .14321 | 6.9827 | .98990 | 51 |
| 10 | .14205 | .14351 | 6.9682 | .98986 | 50 |
| 11 | .14234 | .14381 | 6.9538 | .98982 | 49 |
| 12 | .14263 | .14410 | 6.9395 | .98978 | 48 |
| 13 | .14292 | .14440 | 6.9252 | .98973 | 47 |
| 14 | .14320 | .14470 | 6.9110 | .98969 | 46 |
| 15 | .14349 | .14499 | 6.8969 | .98965 | 45 |
| 16 | .14378 | .14529 | 6.8828 | .98961 | 44 |
| 17 | .14407 | .14559 | 6.8687 | .98957 | 43 |
| 18 | .14436 | .14588 | 6.8548 | .98953 | 42 |
| 19 | .14464 | .14618 | 6.8408 | .98948 | 41 |
| 20 | .14493 | .14648 | 6.8269 | .98944 | 40 |
| 21 | .14522 | .14678 | 6.8131 | .98940 | 39 |
| 22 | .14551 | .14707 | 6.7994 | .98936 | 38 |
| 23 | .14580 | .14737 | 6.7856 | .98931 | 37 |
| 24 | .14608 | .14767 | 6.7720 | .98927 | 36 |
| 25 | .14637 | .14796 | 6.7584 | .98923 | 35 |
| 26 | .14666 | .14826 | 6.7448 | .98919 | 34 |
| 27 | .14695 | .14856 | 6.7313 | .98914 | 33 |
| 28 | .14723 | .14886 | 6.7179 | .98910 | 32 |
| 29 | .14752 | .14915 | 6.7045 | .98906 | 31 |
| 30 | .14781 | .14945 | 6.6912 | .98902 | 30 |
| 31 | .14810 | .14975 | 6.6779 | .98897 | 29 |
| 32 | .14838 | .15005 | 6.6646 | .98893 | 28 |
| 33 | .14867 | .15034 | 6.6514 | .98889 | 27 |
| 34 | .14896 | .15064 | 6.6383 | .98884 | 26 |
| 35 | .14925 | .15094 | 6.6252 | .98880 | 25 |
| 36 | .14954 | .15124 | 6.6122 | .98876 | 24 |
| 37 | .14982 | .15153 | 6.5992 | .98871 | 23 |
| 38 | .15011 | .15183 | 6.5863 | .98867 | 22 |
| 39 | .15040 | .15213 | 6.5734 | .98863 | 21 |
| 40 | .15069 | .15243 | 6.5606 | .98858 | 20 |
| 41 | .15097 | .15272 | 6.5478 | .98854 | 19 |
| 42 | .15126 | .15302 | 6.5350 | .98849 | 18 |
| 43 | .15155 | .15332 | 6.5223 | .98845 | 17 |
| 44 | .15184 | .15362 | 6.5097 | .98841 | 16 |
| 45 | .15212 | .15391 | 6.4971 | .98836 | 15 |
| 46 | .15241 | .15421 | 6.4846 | .98832 | 14 |
| 47 | .15270 | .15451 | 6.4721 | .98827 | 13 |
| 48 | .15299 | .15481 | 6.4596 | .98823 | 12 |
| 49 | .15327 | .15511 | 6.4472 | .98818 | 11 |
| 50 | .15356 | .15540 | 6.4348 | .98814 | 10 |
| 51 | .15385 | .15570 | 6.4225 | .98809 | 9 |
| 52 | .15414 | .15600 | 6.4103 | .98805 | 8 |
| 53 | .15442 | .15630 | 6.3980 | .98800 | 7 |
| 54 | .15471 | .15660 | 6.3859 | .98796 | 6 |
| 55 | .15500 | .15689 | 6.3737 | .98791 | 5 |
| 56 | .15529 | .15719 | 6.3617 | .98787 | 4 |
| 57 | .15557 | .15749 | 6.3496 | .98782 | 3 |
| 58 | .15586 | .15779 | 6.3376 | .98778 | 2 |
| 59 | .15615 | .15809 | 6.3257 | .98773 | 1 |
| 60 | .15643 | .15838 | 6.3138 | .98769 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

98° (278°)

(261°) 81°

99° (279°)

(260°) 80°

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .15643 | .15838 | 6.3138 | .98769 | 60 |
| 1 | .15672 | .15868 | 6.3019 | .98764 | 59 |
| 2 | .15701 | .15898 | 6.2901 | .98760 | 58 |
| 3 | .15730 | .15928 | 6.2783 | .98755 | 57 |
| 4 | .15758 | .15958 | 6.2666 | .98751 | 56 |
| 5 | .15787 | .15988 | 6.2549 | .98746 | 55 |
| 6 | .15816 | .16017 | 6.2432 | .98741 | 54 |
| 7 | .15845 | .16047 | 6.2316 | .98737 | 53 |
| 8 | .15873 | .16077 | 6.2200 | .98732 | 52 |
| 9 | .15902 | .16107 | 6.2085 | .98728 | 51 |
| 10 | .15931 | .16137 | 6.1970 | .98723 | 50 |
| 11 | .15959 | .16167 | 6.1856 | .98718 | 49 |
| 12 | .15988 | .16196 | 6.1742 | .98714 | 48 |
| 13 | .16017 | .16226 | 6.1628 | .98709 | 47 |
| 14 | .16046 | .16256 | 6.1515 | .98704 | 46 |
| 15 | .16074 | .16286 | 6.1402 | .98700 | 45 |
| 16 | .16103 | .16316 | 6.1290 | .98695 | 44 |
| 17 | .16132 | .16346 | 6.1178 | .98690 | 43 |
| 18 | .16160 | .16376 | 6.1066 | .98686 | 42 |
| 19 | .16189 | .16405 | 6.0955 | .98681 | 41 |
| 20 | .16218 | .16435 | 6.0844 | .98676 | 40 |
| 21 | .16246 | .16465 | 6.0734 | .98671 | 39 |
| 22 | .16275 | .16495 | 6.0624 | .98667 | 38 |
| 23 | .16304 | .16525 | 6.0514 | .98662 | 37 |
| 24 | .16333 | .16555 | 6.0405 | .98657 | 36 |
| 25 | .16361 | .16585 | 6.0296 | .98652 | 35 |
| 26 | .16390 | .16615 | 6.0188 | .98648 | 34 |
| 27 | .16419 | .16645 | 6.0080 | .98643 | 33 |
| 28 | .16447 | .16674 | 5.9972 | .98638 | 32 |
| 29 | .16476 | .16704 | 5.9865 | .98633 | 31 |
| 30 | .16505 | .16734 | 5.9758 | .98629 | 30 |
| 31 | .16533 | .16764 | 5.9651 | .98624 | 29 |
| 32 | .16562 | .16794 | 5.9545 | .98619 | 28 |
| 33 | .16591 | .16824 | 5.9439 | .98614 | 27 |
| 34 | .16620 | .16854 | 5.9333 | .98609 | 26 |
| 35 | .16648 | .16884 | 5.9228 | .98604 | 25 |
| 36 | .16677 | .16914 | 5.9124 | .98600 | 24 |
| 37 | .16706 | .16944 | 5.9019 | .98595 | 23 |
| 38 | .16734 | .16974 | 5.8915 | .98590 | 22 |
| 39 | .16763 | .17004 | 5.8811 | .98585 | 21 |
| 40 | .16792 | .17033 | 5.8708 | .98580 | 20 |
| 41 | .16820 | .17063 | 5.8605 | .98575 | 19 |
| 42 | .16849 | .17093 | 5.8502 | .98570 | 18 |
| 43 | .16878 | .17123 | 5.8400 | .98565 | 17 |
| 44 | .16906 | .17153 | 5.8298 | .98561 | 16 |
| 45 | .16935 | .17183 | 5.8197 | .98556 | 15 |
| 46 | .16964 | .17213 | 5.8095 | .98551 | 14 |
| 47 | .16992 | .17243 | 5.7994 | .98546 | 13 |
| 48 | .17021 | .17273 | 5.7894 | .98541 | 12 |
| 49 | .17050 | .17303 | 5.7794 | .98536 | 11 |
| 50 | .17078 | .17333 | 5.7694 | .98531 | 10 |
| 51 | .17107 | .17363 | 5.7594 | .98526 | 9 |
| 52 | .17136 | .17393 | 5.7495 | .98521 | 8 |
| 53 | .17164 | .17423 | 5.7396 | .98516 | 7 |
| 54 | .17193 | .17453 | 5.7297 | .98511 | 6 |
| 55 | .17222 | .17483 | 5.7199 | .98506 | 5 |
| 56 | .17250 | .17513 | 5.7101 | .98501 | 4 |
| 57 | .17279 | .17543 | 5.7004 | .98496 | 3 |
| 58 | .17308 | .17573 | 5.6906 | .98491 | 2 |
| 59 | .17336 | .17603 | 5.6809 | .98486 | 1 |
| 60 | .17365 | .17633 | 5.6713 | .98481 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

NATURAL FUNCTIONS (Continued)

10° (190°)

(349°) 169°

11° (191°)

(348°) 168°

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .17365 | .17633 | 5.6713 | .98481 | 60 |
| 1 | .17393 | .17663 | 5.6617 | .98476 | 59 |
| 2 | .17422 | .17693 | 5.6521 | .98471 | 58 |
| 3 | .17451 | .17723 | 5.6425 | .98466 | 57 |
| 4 | .17479 | .17753 | 5.6329 | .98461 | 56 |
| 5 | .17508 | .17783 | 5.6234 | .98455 | 55 |
| 6 | .17537 | .17813 | 5.6140 | .98450 | 54 |
| 7 | .17565 | .17843 | 5.6045 | .98445 | 53 |
| 8 | .17594 | .17873 | 5.5951 | .98440 | 52 |
| 9 | .17623 | .17903 | 5.5857 | .98435 | 51 |
| 10 | .17651 | .17933 | 5.5764 | .98430 | 50 |
| 11 | .17680 | .17963 | 5.5671 | .98425 | 49 |
| 12 | .17708 | .17993 | 5.5578 | .98420 | 48 |
| 13 | .17737 | .18023 | 5.5485 | .98414 | 47 |
| 14 | .17766 | .18053 | 5.5393 | .98409 | 46 |
| 15 | .17794 | .18083 | 5.5301 | .98404 | 45 |
| 16 | .17823 | .18113 | 5.5209 | .98399 | 44 |
| 17 | .17852 | .18143 | 5.5118 | .98394 | 43 |
| 18 | .17880 | .18173 | 5.5026 | .98389 | 42 |
| 19 | .17909 | .18203 | 5.4936 | .98383 | 41 |
| 20 | .17937 | .18233 | 5.4845 | .98378 | 40 |
| 21 | .17966 | .18263 | 5.4755 | .98373 | 39 |
| 22 | .17995 | .18293 | 5.4665 | .98368 | 38 |
| 23 | .18023 | .18323 | 5.4575 | .98362 | 37 |
| 24 | .18052 | .18353 | 5.4486 | .98357 | 36 |
| 25 | .18081 | .18384 | 5.4397 | .98352 | 35 |
| 26 | .18109 | .18414 | 5.4308 | .98347 | 34 |
| 27 | .18138 | .18444 | 5.4219 | .98341 | 33 |
| 28 | .18166 | .18474 | 5.4131 | .98336 | 32 |
| 29 | .18195 | .18504 | 5.4043 | .98331 | 31 |
| 30 | .18224 | .18534 | 5.3955 | .98325 | 30 |
| 31 | .18252 | .18564 | 5.3868 | .98320 | 29 |
| 32 | .18281 | .18594 | 5.3781 | .98315 | 28 |
| 33 | .18309 | .18624 | 5.3694 | .98310 | 27 |
| 34 | .18338 | .18654 | 5.3607 | .98304 | 26 |
| 35 | .18367 | .18684 | 5.3521 | .98299 | 25 |
| 36 | .18395 | .18714 | 5.3435 | .98294 | 24 |
| 37 | .18424 | .18745 | 5.3349 | .98288 | 23 |
| 38 | .18452 | .18775 | 5.3263 | .98283 | 22 |
| 39 | .18481 | .18805 | 5.3178 | .98277 | 21 |
| 40 | .18509 | .18835 | 5.3093 | .98272 | 20 |
| 41 | .18538 | .18865 | 5.3008 | .98267 | 19 |
| 42 | .18567 | .18895 | 5.2924 | .98261 | 18 |
| 43 | .18595 | .18925 | 5.2839 | .98256 | 17 |
| 44 | .18624 | .18955 | 5.2755 | .98250 | 16 |
| 45 | .18652 | .18986 | 5.2672 | .98245 | 15 |
| 46 | .18681 | .19016 | 5.2588 | .98240 | 14 |
| 47 | .18710 | .19046 | 5.2505 | .98234 | 13 |
| 48 | .18738 | .19076 | 5.2422 | .98229 | 12 |
| 49 | .18767 | .19106 | 5.2339 | .98223 | 11 |
| 50 | .18795 | .19136 | 5.2257 | .98218 | 10 |
| 51 | .18824 | .19166 | 5.2174 | .98212 | 9 |
| 52 | .18852 | .19197 | 5.2092 | .98207 | 8 |
| 53 | .18881 | .19227 | 5.2011 | .98201 | 7 |
| 54 | .18910 | .19257 | 5.1929 | .98196 | 6 |
| 55 | .18938 | .19287 | 5.1848 | .98190 | 5 |
| 56 | .18967 | .19317 | 5.1767 | .98185 | 4 |
| 57 | .18995 | .19347 | 5.1686 | .98179 | 3 |
| 58 | .19024 | .19378 | 5.1606 | .98174 | 2 |
| 59 | .19052 | .19408 | 5.1526 | .98168 | 1 |
| 60 | .19081 | .19438 | 5.1446 | .98163 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .19081 | .19438 | 5.1446 | .98163 | 60 |
| 1 | .19109 | .19468 | 5.1366 | .98157 | 59 |
| 2 | .19138 | .19498 | 5.1286 | .98152 | 58 |
| 3 | .19167 | .19529 | 5.1207 | .98146 | 57 |
| 4 | .19195 | .19559 | 5.1128 | .98140 | 56 |
| 5 | .19224 | .19589 | 5.1049 | .98135 | 55 |
| 6 | .19252 | .19619 | 5.0970 | .98129 | 54 |
| 7 | .19281 | .19649 | 5.0892 | .98124 | 53 |
| 8 | .19309 | .19680 | 5.0814 | .98118 | 52 |
| 9 | .19338 | .19710 | 5.0736 | .98112 | 51 |
| 10 | .19366 | .19740 | 5.0658 | .98107 | 50 |
| 11 | .19395 | .19770 | 5.0581 | .98101 | 49 |
| 12 | .19423 | .19801 | 5.0504 | .98096 | 48 |
| 13 | .19452 | .19831 | 5.0427 | .98090 | 47 |
| 14 | .19481 | .19861 | 5.0350 | .98084 | 46 |
| 15 | .19509 | .19891 | 5.0273 | .98079 | 45 |
| 16 | .19538 | .19921 | 5.0197 | .98073 | 44 |
| 17 | .19566 | .19952 | 5.0121 | .98067 | 43 |
| 18 | .19595 | .19982 | 5.0045 | .98061 | 42 |
| 19 | .19623 | .20012 | 4.9969 | .98056 | 41 |
| 20 | .19652 | .20042 | 4.9894 | .98050 | 40 |
| 21 | .19680 | .20073 | 4.9819 | .98044 | 39 |
| 22 | .19709 | .20103 | 4.9744 | .98039 | 38 |
| 23 | .19737 | .20133 | 4.9669 | .98033 | 37 |
| 24 | .19766 | .20164 | 4.9594 | .98027 | 36 |
| 25 | .19794 | .20194 | 4.9520 | .98021 | 35 |
| 26 | .19823 | .20224 | 4.9446 | .98016 | 34 |
| 27 | .19851 | .20254 | 4.9372 | .98010 | 33 |
| 28 | .19880 | .20285 | 4.9298 | .98004 | 32 |
| 29 | .19908 | .20315 | 4.9225 | .97998 | 31 |
| 30 | .19937 | .20345 | 4.9152 | .97992 | 30 |
| 31 | .19965 | .20376 | 4.9078 | .97987 | 29 |
| 32 | .19994 | .20406 | 4.9006 | .97981 | 28 |
| 33 | .20022 | .20436 | 4.8933 | .97975 | 27 |
| 34 | .20051 | .20466 | 4.8860 | .97969 | 26 |
| 35 | .20079 | .20497 | 4.8788 | .97963 | 25 |
| 36 | .20108 | .20527 | 4.8716 | .97958 | 24 |
| 37 | .20136 | .20557 | 4.8644 | .97952 | 23 |
| 38 | .20165 | .20588 | 4.8573 | .97946 | 22 |
| 39 | .20193 | .20618 | 4.8501 | .97940 | 21 |
| 40 | .20222 | .20648 | 4.8430 | .97934 | 20 |
| 41 | .20250 | .20679 | 4.8359 | .97928 | 19 |
| 42 | .20279 | .20709 | 4.8288 | .97922 | 18 |
| 43 | .20307 | .20739 | 4.8218 | .97916 | 17 |
| 44 | .20336 | .20770 | 4.8147 | .97910 | 16 |
| 45 | .20364 | .20800 | 4.8077 | .97905 | 15 |
| 46 | .20393 | .20830 | 4.8007 | .97899 | 14 |
| 47 | .20421 | .20861 | 4.7937 | .97893 | 13 |
| 48 | .20450 | .20891 | 4.7867 | .97887 | 12 |
| 49 | .20478 | .20921 | 4.7798 | .97881 | 11 |
| 50 | .20507 | .20952 | 4.7729 | .97875 | 10 |
| 51 | .20535 | .20982 | 4.7659 | .97869 | 9 |
| 52 | .20563 | .21013 | 4.7591 | .97863 | 8 |
| 53 | .20592 | .21043 | 4.7522 | .97857 | 7 |
| 54 | .20620 | .21073 | 4.7453 | .97851 | 6 |
| 55 | .20649 | .21104 | 4.7385 | .97845 | 5 |
| 56 | .20677 | .21134 | 4.7317 | .97839 | 4 |
| 57 | .20706 | .21164 | 4.7249 | .97833 | 3 |
| 58 | .20734 | .21195 | 4.7181 | .97827 | 2 |
| 59 | .20763 | .21225 | 4.7114 | .97821 | 1 |
| 60 | .20791 | .21256 | 4.7046 | .97815 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

100° (280°)

(259°) 79°

101° (281°)

(258°) 78°

NATURAL FUNCTIONS (Continued)

12° (192°)

(347°) 167°

13° (193°)

(346°) 166°

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .20791 | .21256 | 4.7046 | .97815 | 60 |
| 1 | .20820 | .21286 | 4.6979 | .97809 | 59 |
| 2 | .20848 | .21316 | 4.6912 | .97803 | 58 |
| 3 | .20877 | .21347 | 4.6845 | .97797 | 57 |
| 4 | .20905 | .21377 | 4.6779 | .97791 | 56 |
| 5 | .20933 | .21408 | 4.6712 | .97784 | 55 |
| 6 | .20962 | .21438 | 4.6646 | .97778 | 54 |
| 7 | .20990 | .21469 | 4.6580 | .97772 | 53 |
| 8 | .21019 | .21499 | 4.6514 | .97766 | 52 |
| 9 | .21047 | .21529 | 4.6448 | .97760 | 51 |
| 10 | .21076 | .21560 | 4.6382 | .97754 | 50 |
| 11 | .21104 | .21590 | 4.6317 | .97748 | 49 |
| 12 | .21132 | .21621 | 4.6252 | .97742 | 48 |
| 13 | .21161 | .21651 | 4.6187 | .97735 | 47 |
| 14 | .21189 | .21682 | 4.6122 | .97729 | 46 |
| 15 | .21218 | .21712 | 4.6057 | .97723 | 45 |
| 16 | .21246 | .21743 | 4.5993 | .97717 | 44 |
| 17 | .21275 | .21773 | 4.5928 | .97711 | 43 |
| 18 | .21303 | .21804 | 4.5864 | .97705 | 42 |
| 19 | .21331 | .21834 | 4.5800 | .97698 | 41 |
| 20 | .21360 | .21864 | 4.5736 | .97692 | 40 |
| 21 | .21388 | .21895 | 4.5673 | .97686 | 39 |
| 22 | .21417 | .21925 | 4.5609 | .97680 | 38 |
| 23 | .21445 | .21956 | 4.5546 | .97673 | 37 |
| 24 | .21474 | .21986 | 4.5483 | .97667 | 36 |
| 25 | .21502 | .22017 | 4.5420 | .97661 | 35 |
| 26 | .21530 | .22047 | 4.5357 | .97655 | 34 |
| 27 | .21559 | .22078 | 4.5294 | .97648 | 33 |
| 28 | .21587 | .22108 | 4.5232 | .97642 | 32 |
| 29 | .21616 | .22139 | 4.5169 | .97636 | 31 |
| 30 | .21644 | .22169 | 4.5107 | .97630 | 30 |
| 31 | .21672 | .22200 | 4.5045 | .97623 | 29 |
| 32 | .21701 | .22231 | 4.4983 | .97617 | 28 |
| 33 | .21729 | .22261 | 4.4922 | .97611 | 27 |
| 34 | .21758 | .22292 | 4.4860 | .97604 | 26 |
| 35 | .21786 | .22322 | 4.4799 | .97598 | 25 |
| 36 | .21814 | .22353 | 4.4737 | .97592 | 24 |
| 37 | .21843 | .22383 | 4.4676 | .97585 | 23 |
| 38 | .21871 | .22414 | 4.4615 | .97579 | 22 |
| 39 | .21899 | .22444 | 4.4555 | .97573 | 21 |
| 40 | .21928 | .22475 | 4.4494 | .97566 | 20 |
| 41 | .21956 | .22505 | 4.4434 | .97560 | 19 |
| 42 | .21985 | .22536 | 4.4373 | .97553 | 18 |
| 43 | .22013 | .22567 | 4.4313 | .97547 | 17 |
| 44 | .22041 | .22597 | 4.4253 | .97541 | 16 |
| 45 | .22070 | .22628 | 4.4194 | .97534 | 15 |
| 46 | .22098 | .22658 | 4.4134 | .97528 | 14 |
| 47 | .22126 | .22689 | 4.4075 | .97521 | 13 |
| 48 | .22155 | .22719 | 4.4015 | .97515 | 12 |
| 49 | .22183 | .22750 | 4.3956 | .97508 | 11 |
| 50 | .22212 | .22781 | 4.3897 | .97502 | 10 |
| 51 | .22240 | .22811 | 4.3838 | .97496 | 9 |
| 52 | .22268 | .22842 | 4.3779 | .97489 | 8 |
| 53 | .22297 | .22872 | 4.3721 | .97483 | 7 |
| 54 | .22325 | .22903 | 4.3662 | .97476 | 6 |
| 55 | .22353 | .22934 | 4.3604 | .97470 | 5 |
| 56 | .22382 | .22964 | 4.3546 | .97463 | 4 |
| 57 | .22410 | .22995 | 4.3488 | .97457 | 3 |
| 58 | .22438 | .23026 | 4.3430 | .97450 | 2 |
| 59 | .22467 | .23056 | 4.3372 | .97444 | 1 |
| 60 | .22495 | .23087 | 4.3315 | .97437 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

102° (282°)

(257°) 77°

103° (283°)

(256°) 76°

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .22495 | .23087 | 4.3315 | .97437 | 60 |
| 1 | .22523 | .23117 | 4.3257 | .97430 | 59 |
| 2 | .22552 | .23148 | 4.3200 | .97424 | 58 |
| 3 | .22580 | .23179 | 4.3143 | .97417 | 57 |
| 4 | .22608 | .23209 | 4.3086 | .97411 | 56 |
| 5 | .22637 | .23240 | 4.3029 | .97404 | 55 |
| 6 | .22665 | .23271 | 4.2972 | .97398 | 54 |
| 7 | .22693 | .23301 | 4.2916 | .97391 | 53 |
| 8 | .22722 | .23332 | 4.2859 | .97384 | 52 |
| 9 | .22750 | .23363 | 4.2803 | .97378 | 51 |
| 10 | .22778 | .23393 | 4.2747 | .97371 | 50 |
| 11 | .22807 | .23424 | 4.2691 | .97365 | 49 |
| 12 | .22835 | .23455 | 4.2635 | .97358 | 48 |
| 13 | .22863 | .23485 | 4.2580 | .97351 | 47 |
| 14 | .22892 | .23516 | 4.2524 | .97345 | 46 |
| 15 | .22920 | .23547 | 4.2468 | .97338 | 45 |
| 16 | .22948 | .23578 | 4.2413 | .97331 | 44 |
| 17 | .22977 | .23608 | 4.2358 | .97325 | 43 |
| 18 | .23005 | .23639 | 4.2303 | .97318 | 42 |
| 19 | .23033 | .23670 | 4.2248 | .97311 | 41 |
| 20 | .23062 | .23700 | 4.2193 | .97304 | 40 |
| 21 | .23090 | .23731 | 4.2139 | .97298 | 39 |
| 22 | .23118 | .23762 | 4.2084 | .97291 | 38 |
| 23 | .23146 | .23793 | 4.2030 | .97284 | 37 |
| 24 | .23175 | .23823 | 4.1976 | .97278 | 36 |
| 25 | .23203 | .23854 | 4.1922 | .97271 | 35 |
| 26 | .23231 | .23885 | 4.1868 | .97264 | 34 |
| 27 | .23260 | .23916 | 4.1814 | .97257 | 33 |
| 28 | .23288 | .23946 | 4.1760 | .97251 | 32 |
| 29 | .23316 | .23977 | 4.1706 | .97244 | 31 |
| 30 | .23345 | .24008 | 4.1653 | .97237 | 30 |
| 31 | .23373 | .24039 | 4.1600 | .97230 | 29 |
| 32 | .23401 | .24069 | 4.1547 | .97223 | 28 |
| 33 | .23429 | .24100 | 4.1493 | .97217 | 27 |
| 34 | .23458 | .24131 | 4.1441 | .97210 | 26 |
| 35 | .23486 | .24162 | 4.1388 | .97203 | 25 |
| 36 | .23514 | .24193 | 4.1335 | .97196 | 24 |
| 37 | .23542 | .24223 | 4.1282 | .97189 | 23 |
| 38 | .23571 | .24254 | 4.1230 | .97182 | 22 |
| 39 | .23599 | .24285 | 4.1178 | .97176 | 21 |
| 40 | .23627 | .24316 | 4.1126 | .97169 | 20 |
| 41 | .23656 | .24347 | 4.1074 | .97162 | 19 |
| 42 | .23684 | .24377 | 4.1022 | .97155 | 18 |
| 43 | .23712 | .24408 | 4.0970 | .97148 | 17 |
| 44 | .23740 | .24439 | 4.0918 | .97141 | 16 |
| 45 | .23769 | .24470 | 4.0867 | .97134 | 15 |
| 46 | .23797 | .24501 | 4.0815 | .97127 | 14 |
| 47 | .23825 | .24532 | 4.0764 | .97120 | 13 |
| 48 | .23853 | .24562 | 4.0713 | .97113 | 12 |
| 49 | .23882 | .24593 | 4.0662 | .97106 | 11 |
| 50 | .23910 | .24624 | 4.0611 | .97100 | 10 |
| 51 | .23938 | .24655 | 4.0560 | .97093 | 9 |
| 52 | .23966 | .24686 | 4.0509 | .97086 | 8 |
| 53 | .23995 | .24717 | 4.0459 | .97079 | 7 |
| 54 | .24023 | .24747 | 4.0408 | .97072 | 6 |
| 55 | .24051 | .24778 | 4.0358 | .97065 | 5 |
| 56 | .24079 | .24809 | 4.0308 | .97058 | 4 |
| 57 | .24108 | .24840 | 4.0257 | .97051 | 3 |
| 58 | .24136 | .24871 | 4.0207 | .97044 | 2 |
| 59 | .24164 | .24902 | 4.0158 | .97037 | 1 |
| 60 | .24192 | .24933 | 4.0108 | .97030 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

TRIGONOMETRIC FORMULAE (Continued)

14° (194°)

(345°) 165°

15° (195°)

(344°) 164°

| | Sin | Tan | Cot | Cos | |
|----|--------|--------|--------|--------|----|
| 0 | .24192 | .24933 | 4.0108 | .97030 | 60 |
| 1 | .24220 | .24964 | 4.0058 | .97023 | 59 |
| 2 | .24249 | .24995 | 4.0009 | .97015 | 58 |
| 3 | .24277 | .25026 | 3.9959 | .97008 | 57 |
| 4 | .24305 | .25056 | 3.9910 | .97001 | 56 |
| 5 | .24333 | .25087 | 3.9861 | .96994 | 55 |
| 6 | .24362 | .25118 | 3.9812 | .96987 | 54 |
| 7 | .24390 | .25149 | 3.9763 | .96980 | 53 |
| 8 | .24418 | .25180 | 3.9714 | .96973 | 52 |
| 9 | .24446 | .25211 | 3.9665 | .96966 | 51 |
| 10 | .24474 | .25242 | 3.9617 | .96959 | 50 |
| 11 | .24503 | .25273 | 3.9568 | .96952 | 49 |
| 12 | .24531 | .25304 | 3.9520 | .96945 | 48 |
| 13 | .24559 | .25335 | 3.9471 | .96937 | 47 |
| 14 | .24587 | .25366 | 3.9423 | .96930 | 46 |
| 15 | .24615 | .25397 | 3.9375 | .96923 | 45 |
| 16 | .24644 | .25428 | 3.9327 | .96916 | 44 |
| 17 | .24672 | .25459 | 3.9279 | .96909 | 43 |
| 18 | .24700 | .25490 | 3.9232 | .96902 | 42 |
| 19 | .24728 | .25521 | 3.9184 | .96894 | 41 |
| 20 | .24756 | .25552 | 3.9136 | .96887 | 40 |
| 21 | .24784 | .25583 | 3.9089 | .96880 | 39 |
| 22 | .24813 | .25614 | 3.9042 | .96873 | 38 |
| 23 | .24841 | .25645 | 3.8995 | .96866 | 37 |
| 24 | .24869 | .25676 | 3.8947 | .96858 | 36 |
| 25 | .24897 | .25707 | 3.8900 | .96851 | 35 |
| 26 | .24925 | .25738 | 3.8854 | .96844 | 34 |
| 27 | .24954 | .25769 | 3.8807 | .96837 | 33 |
| 28 | .24982 | .25800 | 3.8760 | .96829 | 32 |
| 29 | .25010 | .25831 | 3.8714 | .96822 | 31 |
| 30 | .25038 | .25862 | 3.8667 | .96815 | 30 |
| 31 | .25066 | .25893 | 3.8621 | .96807 | 29 |
| 32 | .25094 | .25924 | 3.8575 | .96800 | 28 |
| 33 | .25122 | .25955 | 3.8528 | .96793 | 27 |
| 34 | .25151 | .25986 | 3.8482 | .96786 | 26 |
| 35 | .25179 | .26017 | 3.8436 | .96778 | 25 |
| 36 | .25207 | .26048 | 3.8391 | .96771 | 24 |
| 37 | .25235 | .26079 | 3.8345 | .96764 | 23 |
| 38 | .25263 | .26110 | 3.8299 | .96756 | 22 |
| 39 | .25291 | .26141 | 3.8254 | .96749 | 21 |
| 40 | .25320 | .26172 | 3.8208 | .96742 | 20 |
| 41 | .25348 | .26203 | 3.8163 | .96734 | 19 |
| 42 | .25376 | .26235 | 3.8118 | .96727 | 18 |
| 43 | .25404 | .26266 | 3.8073 | .96719 | 17 |
| 44 | .25432 | .26297 | 3.8028 | .96712 | 16 |
| 45 | .25460 | .26328 | 3.7983 | .96705 | 15 |
| 46 | .25488 | .26359 | 3.7938 | .96697 | 14 |
| 47 | .25516 | .26390 | 3.7893 | .96690 | 13 |
| 48 | .25545 | .26421 | 3.7848 | .96682 | 12 |
| 49 | .25573 | .26452 | 3.7804 | .96675 | 11 |
| 50 | .25601 | .26483 | 3.7760 | .96667 | 10 |
| 51 | .25629 | .26515 | 3.7715 | .96660 | 9 |
| 52 | .25657 | .26546 | 3.7671 | .96653 | 8 |
| 53 | .25685 | .26577 | 3.7627 | .96645 | 7 |
| 54 | .25713 | .26608 | 3.7583 | .96638 | 6 |
| 55 | .25741 | .26639 | 3.7539 | .96630 | 5 |
| 56 | .25769 | .26670 | 3.7495 | .96623 | 4 |
| 57 | .25798 | .26701 | 3.7451 | .96615 | 3 |
| 58 | .25826 | .26733 | 3.7408 | .96608 | 2 |
| 59 | .25854 | .26764 | 3.7364 | .96600 | 1 |
| 60 | .25882 | .26795 | 3.7321 | .96593 | 0 |
| | Cos | Cot | Tan | Sin | |

104° (284°)

(255°) 75°

105° (285°)

(254°) 74°

| | Sin | Tan | Cot | Cos | |
|----|--------|--------|--------|--------|----|
| 0 | .25882 | .26795 | 3.7321 | .96593 | 60 |
| 1 | .25910 | .26826 | 3.7277 | .96585 | 59 |
| 2 | .25938 | .26857 | 3.7234 | .96578 | 58 |
| 3 | .25966 | .26888 | 3.7191 | .96570 | 57 |
| 4 | .25994 | .26920 | 3.7148 | .96562 | 56 |
| 5 | .26022 | .26951 | 3.7105 | .96555 | 55 |
| 6 | .26050 | .26982 | 3.7062 | .96547 | 54 |
| 7 | .26079 | .27013 | 3.7019 | .96540 | 53 |
| 8 | .26107 | .27044 | 3.6976 | .96532 | 52 |
| 9 | .26135 | .27076 | 3.6933 | .96524 | 51 |
| 10 | .26163 | .27107 | 3.6891 | .96517 | 50 |
| 11 | .26191 | .27138 | 3.6848 | .96509 | 49 |
| 12 | .26219 | .27169 | 3.6806 | .96502 | 48 |
| 13 | .26247 | .27201 | 3.6764 | .96494 | 47 |
| 14 | .26275 | .27232 | 3.6722 | .96486 | 46 |
| 15 | .26303 | .27263 | 3.6680 | .96479 | 45 |
| 16 | .26331 | .27294 | 3.6638 | .96471 | 44 |
| 17 | .26359 | .27326 | 3.6596 | .96463 | 43 |
| 18 | .26387 | .27357 | 3.6554 | .96456 | 42 |
| 19 | .26415 | .27388 | 3.6512 | .96448 | 41 |
| 20 | .26443 | .27419 | 3.6470 | .96440 | 40 |
| 21 | .26471 | .27451 | 3.6429 | .96433 | 39 |
| 22 | .26500 | .27482 | 3.6387 | .96425 | 38 |
| 23 | .26528 | .27513 | 3.6346 | .96417 | 37 |
| 24 | .26556 | .27545 | 3.6305 | .96410 | 36 |
| 25 | .26584 | .27576 | 3.6264 | .96402 | 35 |
| 26 | .26612 | .27607 | 3.6222 | .96394 | 34 |
| 27 | .26640 | .27638 | 3.6181 | .96386 | 33 |
| 28 | .26668 | .27670 | 3.6140 | .96379 | 32 |
| 29 | .26696 | .27701 | 3.6100 | .96371 | 31 |
| 30 | .26724 | .27732 | 3.6059 | .96363 | 30 |
| 31 | .26752 | .27764 | 3.6018 | .96355 | 29 |
| 32 | .26780 | .27795 | 3.5978 | .96347 | 28 |
| 33 | .26808 | .27826 | 3.5937 | .96340 | 27 |
| 34 | .26836 | .27858 | 3.5897 | .96332 | 26 |
| 35 | .26864 | .27889 | 3.5856 | .96324 | 25 |
| 36 | .26892 | .27921 | 3.5816 | .96316 | 24 |
| 37 | .26920 | .27952 | 3.5776 | .96308 | 23 |
| 38 | .26948 | .27983 | 3.5736 | .96301 | 22 |
| 39 | .26976 | .28015 | 3.5696 | .96293 | 21 |
| 40 | .27004 | .28046 | 3.5656 | .96285 | 20 |
| 41 | .27032 | .28077 | 3.5616 | .96277 | 19 |
| 42 | .27060 | .28109 | 3.5576 | .96269 | 18 |
| 43 | .27088 | .28140 | 3.5536 | .96261 | 17 |
| 44 | .27116 | .28172 | 3.5497 | .96253 | 16 |
| 45 | .27144 | .28203 | 3.5457 | .96246 | 15 |
| 46 | .27172 | .28234 | 3.5418 | .96238 | 14 |
| 47 | .27200 | .28266 | 3.5379 | .96230 | 13 |
| 48 | .27228 | .28297 | 3.5339 | .96222 | 12 |
| 49 | .27256 | .28329 | 3.5300 | .96214 | 11 |
| 50 | .27284 | .28360 | 3.5261 | .96206 | 10 |
| 51 | .27312 | .28391 | 3.5222 | .96198 | 9 |
| 52 | .27340 | .28423 | 3.5183 | .96190 | 8 |
| 53 | .27368 | .28454 | 3.5144 | .96182 | 7 |
| 54 | .27396 | .28486 | 3.5105 | .96174 | 6 |
| 55 | .27424 | .28517 | 3.5067 | .96166 | 5 |
| 56 | .27452 | .28549 | 3.5028 | .96158 | 4 |
| 57 | .27480 | .28580 | 3.4989 | .96150 | 3 |
| 58 | .27508 | .28612 | 3.4951 | .96142 | 2 |
| 59 | .27536 | .28643 | 3.4912 | .96134 | 1 |
| 60 | .27564 | .28675 | 3.4874 | .96126 | 0 |
| | Cos | Cot | Tan | Sin | |

NATURAL FUNCTIONS (Continued)

16° (196°)

(343°) 163°

17° (197°)

(342°) 162°

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .27564 | .28675 | 3.4874 | .96126 | 60 |
| 1 | .27592 | .28706 | 3.4836 | .96118 | 59 |
| 2 | .27620 | .28738 | 3.4798 | .96110 | 58 |
| 3 | .27648 | .28769 | 3.4760 | .96102 | 57 |
| 4 | .27676 | .28801 | 3.4722 | .96094 | 56 |
| 5 | .27704 | .28832 | 3.4684 | .96086 | 55 |
| 6 | .27731 | .28864 | 3.4646 | .96078 | 54 |
| 7 | .27759 | .28895 | 3.4608 | .96070 | 53 |
| 8 | .27787 | .28927 | 3.4570 | .96062 | 52 |
| 9 | .27815 | .28958 | 3.4533 | .96054 | 51 |
| 10 | .27843 | .28990 | 3.4495 | .96046 | 50 |
| 11 | .27871 | .29021 | 3.4458 | .96037 | 49 |
| 12 | .27899 | .29053 | 3.4420 | .96029 | 48 |
| 13 | .27927 | .29084 | 3.4383 | .96021 | 47 |
| 14 | .27955 | .29116 | 3.4346 | .96013 | 46 |
| 15 | .27983 | .29147 | 3.4308 | .96005 | 45 |
| 16 | .28011 | .29179 | 3.4271 | .95997 | 44 |
| 17 | .28039 | .29210 | 3.4234 | .95989 | 43 |
| 18 | .28067 | .29242 | 3.4197 | .95981 | 42 |
| 19 | .28095 | .29274 | 3.4160 | .95972 | 41 |
| 20 | .28123 | .29305 | 3.4124 | .95964 | 40 |
| 21 | .28150 | .29337 | 3.4087 | .95956 | 39 |
| 22 | .28178 | .29368 | 3.4050 | .95948 | 38 |
| 23 | .28206 | .29400 | 3.4014 | .95940 | 37 |
| 24 | .28234 | .29432 | 3.3977 | .95931 | 36 |
| 25 | .28262 | .29463 | 3.3941 | .95923 | 35 |
| 26 | .28290 | .29495 | 3.3904 | .95915 | 34 |
| 27 | .28318 | .29526 | 3.3868 | .95907 | 33 |
| 28 | .28346 | .29558 | 3.3832 | .95898 | 32 |
| 29 | .28374 | .29590 | 3.3796 | .95890 | 31 |
| 30 | .28402 | .29621 | 3.3759 | .95882 | 30 |
| 31 | .28429 | .29653 | 3.3723 | .95874 | 29 |
| 32 | .28457 | .29685 | 3.3687 | .95865 | 28 |
| 33 | .28485 | .29716 | 3.3652 | .95857 | 27 |
| 34 | .28513 | .29748 | 3.3616 | .95849 | 26 |
| 35 | .28541 | .29780 | 3.3580 | .95841 | 25 |
| 36 | .28569 | .29811 | 3.3544 | .95832 | 24 |
| 37 | .28597 | .29843 | 3.3509 | .95824 | 23 |
| 38 | .28625 | .29875 | 3.3473 | .95816 | 22 |
| 39 | .28652 | .29906 | 3.3438 | .95807 | 21 |
| 40 | .28680 | .29938 | 3.3402 | .95799 | 20 |
| 41 | .28708 | .29970 | 3.3367 | .95791 | 19 |
| 42 | .28736 | .30001 | 3.3332 | .95782 | 18 |
| 43 | .28764 | .30033 | 3.3297 | .95774 | 17 |
| 44 | .28792 | .30065 | 3.3261 | .95766 | 16 |
| 45 | .28820 | .30097 | 3.3226 | .95757 | 15 |
| 46 | .28847 | .30128 | 3.3191 | .95749 | 14 |
| 47 | .28875 | .30160 | 3.3156 | .95740 | 13 |
| 48 | .28903 | .30192 | 3.3122 | .95732 | 12 |
| 49 | .28931 | .30224 | 3.3087 | .95724 | 11 |
| 50 | .28959 | .30255 | 3.3052 | .95715 | 10 |
| 51 | .28987 | .30287 | 3.3017 | .95707 | 9 |
| 52 | .29015 | .30319 | 3.2983 | .95698 | 8 |
| 53 | .29042 | .30351 | 3.2948 | .95690 | 7 |
| 54 | .29070 | .30382 | 3.2914 | .95681 | 6 |
| 55 | .29098 | .30414 | 3.2879 | .95673 | 5 |
| 56 | .29126 | .30446 | 3.2845 | .95664 | 4 |
| 57 | .29154 | .30478 | 3.2811 | .95656 | 3 |
| 58 | .29182 | .30509 | 3.2777 | .95647 | 2 |
| 59 | .29209 | .30541 | 3.2743 | .95639 | 1 |
| 60 | .29237 | .30573 | 3.2709 | .95630 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

106° (286°)

(253°) 73°

107° (287°)

(252°) 72°

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .29237 | .30573 | 3.2709 | .95630 | 60 |
| 1 | .29265 | .30605 | 3.2675 | .95622 | 59 |
| 2 | .29293 | .30637 | 3.2641 | .95613 | 58 |
| 3 | .29321 | .30669 | 3.2607 | .95605 | 57 |
| 4 | .29348 | .30700 | 3.2573 | .95596 | 56 |
| 5 | .29376 | .30732 | 3.2539 | .95588 | 55 |
| 6 | .29404 | .30764 | 3.2506 | .95579 | 54 |
| 7 | .29432 | .30796 | 3.2472 | .95571 | 53 |
| 8 | .29460 | .30828 | 3.2438 | .95562 | 52 |
| 9 | .29487 | .30860 | 3.2405 | .95554 | 51 |
| 10 | .29515 | .30891 | 3.2371 | .95545 | 50 |
| 11 | .29543 | .30923 | 3.2338 | .95536 | 49 |
| 12 | .29571 | .30955 | 3.2305 | .95528 | 48 |
| 13 | .29599 | .30987 | 3.2272 | .95519 | 47 |
| 14 | .29626 | .31019 | 3.2238 | .95511 | 46 |
| 15 | .29654 | .31051 | 3.2205 | .95502 | 45 |
| 16 | .29682 | .31083 | 3.2172 | .95493 | 44 |
| 17 | .29710 | .31115 | 3.2139 | .95485 | 43 |
| 18 | .29737 | .31147 | 3.2106 | .95476 | 42 |
| 19 | .29765 | .31178 | 3.2073 | .95467 | 41 |
| 20 | .29793 | .31210 | 3.2041 | .95459 | 40 |
| 21 | .29821 | .31242 | 3.2008 | .95450 | 39 |
| 22 | .29849 | .31274 | 3.1975 | .95441 | 38 |
| 23 | .29876 | .31306 | 3.1943 | .95433 | 37 |
| 24 | .29904 | .31338 | 3.1910 | .95424 | 36 |
| 25 | .29932 | .31370 | 3.1878 | .95415 | 35 |
| 26 | .29960 | .31402 | 3.1845 | .95407 | 34 |
| 27 | .29987 | .31434 | 3.1813 | .95398 | 33 |
| 28 | .30015 | .31466 | 3.1780 | .95389 | 32 |
| 29 | .30043 | .31498 | 3.1748 | .95380 | 31 |
| 30 | .30071 | .31530 | 3.1716 | .95372 | 30 |
| 31 | .30098 | .31562 | 3.1684 | .95363 | 29 |
| 32 | .30126 | .31594 | 3.1652 | .95354 | 28 |
| 33 | .30154 | .31626 | 3.1620 | .95345 | 27 |
| 34 | .30182 | .31658 | 3.1588 | .95337 | 26 |
| 35 | .30209 | .31690 | 3.1556 | .95328 | 25 |
| 36 | .30237 | .31722 | 3.1524 | .95319 | 24 |
| 37 | .30265 | .31754 | 3.1492 | .95310 | 23 |
| 38 | .30292 | .31786 | 3.1460 | .95301 | 22 |
| 39 | .30320 | .31818 | 3.1429 | .95293 | 21 |
| 40 | .30348 | .31850 | 3.1397 | .95284 | 20 |
| 41 | .30376 | .31882 | 3.1366 | .95275 | 19 |
| 42 | .30403 | .31914 | 3.1334 | .95266 | 18 |
| 43 | .30431 | .31946 | 3.1303 | .95257 | 17 |
| 44 | .30459 | .31978 | 3.1271 | .95248 | 16 |
| 45 | .30486 | .32010 | 3.1240 | .95240 | 15 |
| 46 | .30514 | .32042 | 3.1209 | .95231 | 14 |
| 47 | .30542 | .32074 | 3.1178 | .95222 | 13 |
| 48 | .30570 | .32106 | 3.1146 | .95213 | 12 |
| 49 | .30597 | .32139 | 3.1115 | .95204 | 11 |
| 50 | .30625 | .32171 | 3.1084 | .95195 | 10 |
| 51 | .30653 | .32203 | 3.1053 | .95186 | 9 |
| 52 | .30680 | .32235 | 3.1022 | .95177 | 8 |
| 53 | .30708 | .32267 | 3.0991 | .95168 | 7 |
| 54 | .30736 | .32299 | 3.0961 | .95159 | 6 |
| 55 | .30763 | .32331 | 3.0930 | .95150 | 5 |
| 56 | .30791 | .32363 | 3.0899 | .95142 | 4 |
| 57 | .30819 | .32396 | 3.0868 | .95133 | 3 |
| 58 | .30846 | .32428 | 3.0838 | .95124 | 2 |
| 59 | .30874 | .32460 | 3.0807 | .95115 | 1 |
| 60 | .30902 | .32492 | 3.0777 | .95106 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

NATURAL FUNCTIONS (Continued)

18° (198°)

(341°) 161°

19° (199°)

(340°) 160°

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .30902 | .32492 | 3.0777 | .95106 | 60 |
| 1 | .30929 | .32524 | 3.0746 | .95097 | 59 |
| 2 | .30957 | .32556 | 3.0716 | .95088 | 58 |
| 3 | .30985 | .32588 | 3.0686 | .95079 | 57 |
| 4 | .31012 | .32621 | 3.0655 | .95070 | 56 |
| 5 | .31040 | .32653 | 3.0625 | .95061 | 55 |
| 6 | .31068 | .32685 | 3.0595 | .95052 | 54 |
| 7 | .31095 | .32717 | 3.0565 | .95043 | 53 |
| 8 | .31123 | .32749 | 3.0535 | .95033 | 52 |
| 9 | .31151 | .32782 | 3.0505 | .95024 | 51 |
| 10 | .31178 | .32814 | 3.0475 | .95015 | 50 |
| 11 | .31206 | .32846 | 3.0445 | .95006 | 49 |
| 12 | .31233 | .32878 | 3.0415 | .94997 | 48 |
| 13 | .31261 | .32911 | 3.0385 | .94988 | 47 |
| 14 | .31289 | .32943 | 3.0356 | .94979 | 46 |
| 15 | .31316 | .32975 | 3.0326 | .94970 | 45 |
| 16 | .31344 | .33007 | 3.0296 | .94961 | 44 |
| 17 | .31372 | .33040 | 3.0267 | .94952 | 43 |
| 18 | .31399 | .33072 | 3.0237 | .94943 | 42 |
| 19 | .31427 | .33104 | 3.0208 | .94933 | 41 |
| 20 | .31454 | .33136 | 3.0178 | .94924 | 40 |
| 21 | .31482 | .33169 | 3.0149 | .94915 | 39 |
| 22 | .31510 | .33201 | 3.0120 | .94906 | 38 |
| 23 | .31537 | .33233 | 3.0090 | .94897 | 37 |
| 24 | .31565 | .33266 | 3.0061 | .94888 | 36 |
| 25 | .31593 | .33298 | 3.0032 | .94878 | 35 |
| 26 | .31620 | .33330 | 3.0003 | .94869 | 34 |
| 27 | .31648 | .33363 | 2.9974 | .94860 | 33 |
| 28 | .31675 | .33395 | 2.9945 | .94851 | 32 |
| 29 | .31703 | .33427 | 2.9916 | .94842 | 31 |
| 30 | .31730 | .33460 | 2.9887 | .94832 | 30 |
| 31 | .31758 | .33492 | 2.9858 | .94823 | 29 |
| 32 | .31786 | .33524 | 2.9829 | .94814 | 28 |
| 33 | .31813 | .33557 | 2.9800 | .94805 | 27 |
| 34 | .31841 | .33589 | 2.9772 | .94795 | 26 |
| 35 | .31868 | .33621 | 2.9743 | .94786 | 25 |
| 36 | .31896 | .33654 | 2.9714 | .94777 | 24 |
| 37 | .31923 | .33686 | 2.9686 | .94768 | 23 |
| 38 | .31951 | .33718 | 2.9657 | .94758 | 22 |
| 39 | .31979 | .33751 | 2.9629 | .94749 | 21 |
| 40 | .32006 | .33783 | 2.9600 | .94740 | 20 |
| 41 | .32034 | .33816 | 2.9572 | .94730 | 19 |
| 42 | .32061 | .33848 | 2.9544 | .94721 | 18 |
| 43 | .32089 | .33881 | 2.9515 | .94712 | 17 |
| 44 | .32116 | .33913 | 2.9487 | .94702 | 16 |
| 45 | .32144 | .33945 | 2.9459 | .94693 | 15 |
| 46 | .32171 | .33978 | 2.9431 | .94684 | 14 |
| 47 | .32199 | .34010 | 2.9403 | .94674 | 13 |
| 48 | .32227 | .34043 | 2.9375 | .94665 | 12 |
| 49 | .32254 | .34075 | 2.9347 | .94656 | 11 |
| 50 | .32282 | .34108 | 2.9319 | .94646 | 10 |
| 51 | .32309 | .34140 | 2.9291 | .94637 | 9 |
| 52 | .32337 | .34173 | 2.9263 | .94628 | 8 |
| 53 | .32364 | .34205 | 2.9235 | .94618 | 7 |
| 54 | .32392 | .34238 | 2.9208 | .94609 | 6 |
| 55 | .32419 | .34270 | 2.9180 | .94599 | 5 |
| 56 | .32447 | .34303 | 2.9152 | .94590 | 4 |
| 57 | .32474 | .34335 | 2.9125 | .94580 | 3 |
| 58 | .32502 | .34368 | 2.9097 | .94571 | 2 |
| 59 | .32529 | .34400 | 2.9070 | .94561 | 1 |
| 60 | .32557 | .34433 | 2.9042 | .94552 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .32557 | .34433 | 2.9042 | .94552 | 60 |
| 1 | .32584 | .34465 | 2.9015 | .94542 | 59 |
| 2 | .32612 | .34498 | 2.8987 | .94533 | 58 |
| 3 | .32639 | .34530 | 2.8960 | .94523 | 57 |
| 4 | .32667 | .34563 | 2.8933 | .94514 | 56 |
| 5 | .32694 | .34596 | 2.8905 | .94504 | 55 |
| 6 | .32722 | .34628 | 2.8878 | .94495 | 54 |
| 7 | .32749 | .34661 | 2.8851 | .94485 | 53 |
| 8 | .32777 | .34693 | 2.8824 | .94476 | 52 |
| 9 | .32804 | .34726 | 2.8797 | .94466 | 51 |
| 10 | .32832 | .34758 | 2.8770 | .94457 | 50 |
| 11 | .32859 | .34791 | 2.8743 | .94447 | 49 |
| 12 | .32887 | .34824 | 2.8716 | .94438 | 48 |
| 13 | .32914 | .34856 | 2.8689 | .94428 | 47 |
| 14 | .32942 | .34889 | 2.8662 | .94418 | 46 |
| 15 | .32969 | .34922 | 2.8636 | .94409 | 45 |
| 16 | .32997 | .34954 | 2.8609 | .94399 | 44 |
| 17 | .33024 | .34987 | 2.8582 | .94390 | 43 |
| 18 | .33051 | .35020 | 2.8556 | .94380 | 42 |
| 19 | .33079 | .35052 | 2.8529 | .94370 | 41 |
| 20 | .33106 | .35085 | 2.8502 | .94361 | 40 |
| 21 | .33134 | .35118 | 2.8476 | .94351 | 39 |
| 22 | .33161 | .35150 | 2.8449 | .94342 | 38 |
| 23 | .33189 | .35183 | 2.8423 | .94332 | 37 |
| 24 | .33216 | .35216 | 2.8397 | .94322 | 36 |
| 25 | .33244 | .35248 | 2.8370 | .94313 | 35 |
| 26 | .33271 | .35281 | 2.8344 | .94303 | 34 |
| 27 | .33298 | .35314 | 2.8318 | .94293 | 33 |
| 28 | .33326 | .35346 | 2.8291 | .94284 | 32 |
| 29 | .33353 | .35379 | 2.8265 | .94274 | 31 |
| 30 | .33381 | .35412 | 2.8239 | .94264 | 30 |
| 31 | .33408 | .35445 | 2.8213 | .94254 | 29 |
| 32 | .33436 | .35477 | 2.8187 | .94245 | 28 |
| 33 | .33463 | .35510 | 2.8161 | .94235 | 27 |
| 34 | .33490 | .35543 | 2.8135 | .94225 | 26 |
| 35 | .33518 | .35576 | 2.8109 | .94215 | 25 |
| 36 | .33545 | .35608 | 2.8083 | .94206 | 24 |
| 37 | .33573 | .35641 | 2.8057 | .94196 | 23 |
| 38 | .33600 | .35674 | 2.8032 | .94186 | 22 |
| 39 | .33627 | .35707 | 2.8006 | .94176 | 21 |
| 40 | .33655 | .35740 | 2.7980 | .94167 | 20 |
| 41 | .33682 | .35772 | 2.7955 | .94157 | 19 |
| 42 | .33710 | .35805 | 2.7929 | .94147 | 18 |
| 43 | .33737 | .35838 | 2.7903 | .94137 | 17 |
| 44 | .33764 | .35871 | 2.7878 | .94127 | 16 |
| 45 | .33792 | .35904 | 2.7852 | .94118 | 15 |
| 46 | .33819 | .35937 | 2.7827 | .94108 | 14 |
| 47 | .33846 | .35969 | 2.7801 | .94098 | 13 |
| 48 | .33874 | .36002 | 2.7776 | .94088 | 12 |
| 49 | .33901 | .36035 | 2.7751 | .94078 | 11 |
| 50 | .33929 | .36068 | 2.7725 | .94068 | 10 |
| 51 | .33956 | .36101 | 2.7700 | .94058 | 9 |
| 52 | .33983 | .36134 | 2.7675 | .94049 | 8 |
| 53 | .34011 | .36167 | 2.7650 | .94039 | 7 |
| 54 | .34038 | .36199 | 2.7625 | .94029 | 6 |
| 55 | .34065 | .36232 | 2.7600 | .94019 | 5 |
| 56 | .34093 | .36265 | 2.7575 | .94009 | 4 |
| 57 | .34120 | .36298 | 2.7550 | .93999 | 3 |
| 58 | .34147 | .36331 | 2.7525 | .93989 | 2 |
| 59 | .34175 | .36364 | 2.7500 | .93979 | 1 |
| 60 | .34202 | .36397 | 2.7475 | .93969 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

108° (288°)

(251°) 71°

109° (289°)

(250°) 70°

NATURAL FUNCTIONS (Continued)

20° (200°)

(339°) 159°

21° (201°)

(338°) 158°

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .34202 | .36397 | 2.7475 | .93969 | 60 |
| 1 | .34229 | .36430 | 2.7450 | .93959 | 59 |
| 2 | .34257 | .36463 | 2.7425 | .93949 | 58 |
| 3 | .34284 | .36496 | 2.7400 | .93939 | 57 |
| 4 | .34311 | .36529 | 2.7376 | .93929 | 56 |
| 5 | .34339 | .36562 | 2.7351 | .93919 | 55 |
| 6 | .34366 | .36595 | 2.7326 | .93909 | 54 |
| 7 | .34393 | .36628 | 2.7302 | .93899 | 53 |
| 8 | .34421 | .36661 | 2.7277 | .93889 | 52 |
| 9 | .34448 | .36694 | 2.7253 | .93879 | 51 |
| 10 | .34475 | .36727 | 2.7228 | .93869 | 50 |
| 11 | .34503 | .36760 | 2.7204 | .93859 | 49 |
| 12 | .34530 | .36793 | 2.7179 | .93849 | 48 |
| 13 | .34557 | .36826 | 2.7155 | .93839 | 47 |
| 14 | .34584 | .36859 | 2.7130 | .93829 | 46 |
| 15 | .34612 | .36892 | 2.7106 | .93819 | 45 |
| 16 | .34639 | .36925 | 2.7082 | .93809 | 44 |
| 17 | .34666 | .36958 | 2.7058 | .93799 | 43 |
| 18 | .34694 | .36991 | 2.7034 | .93789 | 42 |
| 19 | .34721 | .37024 | 2.7009 | .93779 | 41 |
| 20 | .34748 | .37057 | 2.6985 | .93769 | 40 |
| 21 | .34775 | .37090 | 2.6961 | .93759 | 39 |
| 22 | .34803 | .37123 | 2.6937 | .93748 | 38 |
| 23 | .34830 | .37157 | 2.6913 | .93738 | 37 |
| 24 | .34857 | .37190 | 2.6889 | .93728 | 36 |
| 25 | .34884 | .37223 | 2.6865 | .93718 | 35 |
| 26 | .34912 | .37256 | 2.6841 | .93708 | 34 |
| 27 | .34939 | .37289 | 2.6818 | .93698 | 33 |
| 28 | .34966 | .37322 | 2.6794 | .93688 | 32 |
| 29 | .34993 | .37355 | 2.6770 | .93677 | 31 |
| 30 | .35021 | .37388 | 2.6746 | .93667 | 30 |
| 31 | .35048 | .37422 | 2.6722 | .93657 | 29 |
| 32 | .35075 | .37455 | 2.6699 | .93647 | 28 |
| 33 | .35102 | .37488 | 2.6675 | .93637 | 27 |
| 34 | .35130 | .37521 | 2.6652 | .93626 | 26 |
| 35 | .35157 | .37554 | 2.6628 | .93616 | 25 |
| 36 | .35184 | .37588 | 2.6605 | .93606 | 24 |
| 37 | .35211 | .37621 | 2.6581 | .93596 | 23 |
| 38 | .35239 | .37654 | 2.6558 | .93585 | 22 |
| 39 | .35266 | .37687 | 2.6534 | .93575 | 21 |
| 40 | .35293 | .37720 | 2.6511 | .93565 | 20 |
| 41 | .35320 | .37754 | 2.6488 | .93555 | 19 |
| 42 | .35347 | .37787 | 2.6464 | .93544 | 18 |
| 43 | .35375 | .37820 | 2.6441 | .93534 | 17 |
| 44 | .35402 | .37853 | 2.6418 | .93524 | 16 |
| 45 | .35429 | .37887 | 2.6395 | .93514 | 15 |
| 46 | .35456 | .37920 | 2.6371 | .93503 | 14 |
| 47 | .35484 | .37953 | 2.6348 | .93493 | 13 |
| 48 | .35511 | .37986 | 2.6325 | .93483 | 12 |
| 49 | .35538 | .38020 | 2.6302 | .93472 | 11 |
| 50 | .35565 | .38053 | 2.6279 | .93462 | 10 |
| 51 | .35592 | .38086 | 2.6256 | .93452 | 9 |
| 52 | .35619 | .38120 | 2.6233 | .93441 | 8 |
| 53 | .35647 | .38153 | 2.6210 | .93431 | 7 |
| 54 | .35674 | .38186 | 2.6187 | .93420 | 6 |
| 55 | .35701 | .38220 | 2.6165 | .93410 | 5 |
| 56 | .35728 | .38253 | 2.6142 | .93400 | 4 |
| 57 | .35755 | .38286 | 2.6119 | .93389 | 3 |
| 58 | .35782 | .38320 | 2.6096 | .93379 | 2 |
| 59 | .35810 | .38353 | 2.6074 | .93368 | 1 |
| 60 | .35837 | .38386 | 2.6051 | .93358 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

110° (290°)

(249°) 69°

111° (291°)

(248°) 68°

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .35837 | .38386 | 2.6051 | .93358 | 60 |
| 1 | .35864 | .38420 | 2.6028 | .93348 | 59 |
| 2 | .35891 | .38453 | 2.6006 | .93337 | 58 |
| 3 | .35918 | .38487 | 2.5983 | .93327 | 57 |
| 4 | .35945 | .38520 | 2.5961 | .93316 | 56 |
| 5 | .35973 | .38553 | 2.5938 | .93306 | 55 |
| 6 | .36000 | .38587 | 2.5916 | .93295 | 54 |
| 7 | .36027 | .38620 | 2.5893 | .93285 | 53 |
| 8 | .36054 | .38654 | 2.5871 | .93274 | 52 |
| 9 | .36081 | .38687 | 2.5848 | .93264 | 51 |
| 10 | .36108 | .38721 | 2.5826 | .93253 | 50 |
| 11 | .36135 | .38754 | 2.5804 | .93243 | 49 |
| 12 | .36162 | .38787 | 2.5782 | .93232 | 48 |
| 13 | .36190 | .38821 | 2.5759 | .93222 | 47 |
| 14 | .36217 | .38854 | 2.5737 | .93211 | 46 |
| 15 | .36244 | .38888 | 2.5715 | .93201 | 45 |
| 16 | .36271 | .38921 | 2.5693 | .93190 | 44 |
| 17 | .36298 | .38955 | 2.5671 | .93180 | 43 |
| 18 | .36325 | .38988 | 2.5649 | .93169 | 42 |
| 19 | .36352 | .39022 | 2.5627 | .93159 | 41 |
| 20 | .36379 | .39055 | 2.5605 | .93148 | 40 |
| 21 | .36406 | .39089 | 2.5583 | .93137 | 39 |
| 22 | .36434 | .39122 | 2.5561 | .93127 | 38 |
| 23 | .36461 | .39156 | 2.5539 | .93116 | 37 |
| 24 | .36488 | .39190 | 2.5517 | .93106 | 36 |
| 25 | .36515 | .39223 | 2.5495 | .93095 | 35 |
| 26 | .36542 | .39257 | 2.5473 | .93084 | 34 |
| 27 | .36569 | .39290 | 2.5452 | .93074 | 33 |
| 28 | .36596 | .39324 | 2.5430 | .93063 | 32 |
| 29 | .36623 | .39357 | 2.5408 | .93052 | 31 |
| 30 | .36650 | .39391 | 2.5386 | .93042 | 30 |
| 31 | .36677 | .39425 | 2.5365 | .93031 | 29 |
| 32 | .36704 | .39458 | 2.5343 | .93020 | 28 |
| 33 | .36731 | .39492 | 2.5322 | .93010 | 27 |
| 34 | .36758 | .39526 | 2.5300 | .92999 | 26 |
| 35 | .36785 | .39559 | 2.5279 | .92988 | 25 |
| 36 | .36812 | .39593 | 2.5257 | .92978 | 24 |
| 37 | .36839 | .39626 | 2.5236 | .92967 | 23 |
| 38 | .36867 | .39660 | 2.5214 | .92956 | 22 |
| 39 | .36894 | .39694 | 2.5193 | .92945 | 21 |
| 40 | .36921 | .39727 | 2.5172 | .92935 | 20 |
| 41 | .36948 | .39761 | 2.5150 | .92924 | 19 |
| 42 | .36975 | .39795 | 2.5129 | .92913 | 18 |
| 43 | .37002 | .39829 | 2.5108 | .92902 | 17 |
| 44 | .37029 | .39862 | 2.5086 | .92892 | 16 |
| 45 | .37056 | .39896 | 2.5065 | .92881 | 15 |
| 46 | .37083 | .39930 | 2.5044 | .92870 | 14 |
| 47 | .37110 | .39963 | 2.5023 | .92859 | 13 |
| 48 | .37137 | .39997 | 2.5002 | .92849 | 12 |
| 49 | .37164 | .40031 | 2.4981 | .92838 | 11 |
| 50 | .37191 | .40065 | 2.4960 | .92827 | 10 |
| 51 | .37218 | .40098 | 2.4939 | .92816 | 9 |
| 52 | .37245 | .40132 | 2.4918 | .92805 | 8 |
| 53 | .37272 | .40166 | 2.4897 | .92794 | 7 |
| 54 | .37299 | .40200 | 2.4876 | .92784 | 6 |
| 55 | .37326 | .40234 | 2.4855 | .92773 | 5 |
| 56 | .37353 | .40267 | 2.4834 | .92762 | 4 |
| 57 | .37380 | .40301 | 2.4813 | .92751 | 3 |
| 58 | .37407 | .40335 | 2.4792 | .92740 | 2 |
| 59 | .37434 | .40369 | 2.4772 | .92729 | 1 |
| 60 | .37461 | .40403 | 2.4751 | .92718 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

NATURAL FUNCTIONS (Continued)

22° (202°)

(337°) 157°

23° (203°)

(336°) 156°

| | Sin | Tan | Cot | Cos | |
|----|--------|--------|--------|--------|----|
| 0 | .37461 | .40403 | 2.4751 | .92718 | 60 |
| 1 | .37488 | .40436 | 2.4730 | .92707 | 59 |
| 2 | .37515 | .40470 | 2.4709 | .92697 | 58 |
| 3 | .37542 | .40504 | 2.4689 | .92686 | 57 |
| 4 | .37569 | .40538 | 2.4668 | .92675 | 56 |
| 5 | .37595 | .40572 | 2.4648 | .92664 | 55 |
| 6 | .37622 | .40606 | 2.4627 | .92653 | 54 |
| 7 | .37649 | .40640 | 2.4606 | .92642 | 53 |
| 8 | .37676 | .40674 | 2.4586 | .92631 | 52 |
| 9 | .37703 | .40707 | 2.4566 | .92620 | 51 |
| 10 | .37730 | .40741 | 2.4545 | .92609 | 50 |
| 11 | .37757 | .40775 | 2.4525 | .92598 | 49 |
| 12 | .37784 | .40809 | 2.4504 | .92587 | 48 |
| 13 | .37811 | .40843 | 2.4484 | .92576 | 47 |
| 14 | .37838 | .40877 | 2.4464 | .92565 | 46 |
| 15 | .37865 | .40911 | 2.4443 | .92554 | 45 |
| 16 | .37892 | .40945 | 2.4423 | .92543 | 44 |
| 17 | .37919 | .40979 | 2.4403 | .92532 | 43 |
| 18 | .37946 | .41013 | 2.4383 | .92521 | 42 |
| 19 | .37973 | .41047 | 2.4362 | .92510 | 41 |
| 20 | .37999 | .41081 | 2.4342 | .92499 | 40 |
| 21 | .38026 | .41115 | 2.4322 | .92488 | 39 |
| 22 | .38053 | .41149 | 2.4302 | .92477 | 38 |
| 23 | .38080 | .41183 | 2.4282 | .92466 | 37 |
| 24 | .38107 | .41217 | 2.4262 | .92455 | 36 |
| 25 | .38134 | .41251 | 2.4242 | .92444 | 35 |
| 26 | .38161 | .41285 | 2.4222 | .92432 | 34 |
| 27 | .38188 | .41319 | 2.4202 | .92421 | 33 |
| 28 | .38215 | .41353 | 2.4182 | .92410 | 32 |
| 29 | .38241 | .41387 | 2.4162 | .92399 | 31 |
| 30 | .38268 | .41421 | 2.4142 | .92388 | 30 |
| 31 | .38295 | .41455 | 2.4122 | .92377 | 29 |
| 32 | .38322 | .41490 | 2.4102 | .92366 | 28 |
| 33 | .38349 | .41524 | 2.4083 | .92355 | 27 |
| 34 | .38376 | .41558 | 2.4063 | .92343 | 26 |
| 35 | .38403 | .41592 | 2.4043 | .92332 | 25 |
| 36 | .38430 | .41626 | 2.4023 | .92321 | 24 |
| 37 | .38456 | .41660 | 2.4004 | .92310 | 23 |
| 38 | .38483 | .41694 | 2.3984 | .92299 | 22 |
| 39 | .38510 | .41728 | 2.3964 | .92287 | 21 |
| 40 | .38537 | .41763 | 2.3945 | .92276 | 20 |
| 41 | .38564 | .41797 | 2.3925 | .92265 | 19 |
| 42 | .38591 | .41831 | 2.3906 | .92254 | 18 |
| 43 | .38617 | .41865 | 2.3886 | .92243 | 17 |
| 44 | .38644 | .41899 | 2.3867 | .92231 | 16 |
| 45 | .38671 | .41933 | 2.3847 | .92220 | 15 |
| 46 | .38698 | .41968 | 2.3828 | .92209 | 14 |
| 47 | .38725 | .42002 | 2.3808 | .92198 | 13 |
| 48 | .38752 | .42036 | 2.3789 | .92186 | 12 |
| 49 | .38778 | .42070 | 2.3770 | .92175 | 11 |
| 50 | .38805 | .42105 | 2.3750 | .92164 | 10 |
| 51 | .38832 | .42139 | 2.3731 | .92152 | 9 |
| 52 | .38859 | .42173 | 2.3712 | .92141 | 8 |
| 53 | .38886 | .42207 | 2.3693 | .92130 | 7 |
| 54 | .38912 | .42242 | 2.3673 | .92119 | 6 |
| 55 | .38939 | .42276 | 2.3654 | .92107 | 5 |
| 56 | .38966 | .42310 | 2.3635 | .92096 | 4 |
| 57 | .38993 | .42345 | 2.3616 | .92085 | 3 |
| 58 | .39020 | .42379 | 2.3597 | .92073 | 2 |
| 59 | .39046 | .42413 | 2.3578 | .92062 | 1 |
| 60 | .39073 | .42447 | 2.3559 | .92050 | 0 |
| | Cos | Cot | Tan | Sin | |

| | Sin | Tan | Cot | Cos | |
|----|--------|--------|--------|--------|----|
| 0 | .39073 | .42447 | 2.3559 | .92050 | 60 |
| 1 | .39100 | .42482 | 2.3539 | .92039 | 59 |
| 2 | .39127 | .42516 | 2.3520 | .92028 | 58 |
| 3 | .39153 | .42551 | 2.3501 | .92016 | 57 |
| 4 | .39180 | .42585 | 2.3483 | .92005 | 56 |
| 5 | .39207 | .42619 | 2.3464 | .91994 | 55 |
| 6 | .39234 | .42654 | 2.3445 | .91982 | 54 |
| 7 | .39260 | .42688 | 2.3426 | .91971 | 53 |
| 8 | .39287 | .42722 | 2.3407 | .91959 | 52 |
| 9 | .39314 | .42757 | 2.3388 | .91948 | 51 |
| 10 | .39341 | .42791 | 2.3369 | .91936 | 50 |
| 11 | .39367 | .42826 | 2.3351 | .91925 | 49 |
| 12 | .39394 | .42860 | 2.3332 | .91914 | 48 |
| 13 | .39421 | .42894 | 2.3313 | .91902 | 47 |
| 14 | .39448 | .42929 | 2.3294 | .91891 | 46 |
| 15 | .39474 | .42963 | 2.3276 | .91879 | 45 |
| 16 | .39501 | .42998 | 2.3257 | .91868 | 44 |
| 17 | .39528 | .43032 | 2.3238 | .91850 | 43 |
| 18 | .39555 | .43067 | 2.3220 | .91845 | 42 |
| 19 | .39581 | .43101 | 2.3201 | .91833 | 41 |
| 20 | .39608 | .43136 | 2.3183 | .91822 | 40 |
| 21 | .39635 | .43170 | 2.3164 | .91810 | 39 |
| 22 | .39661 | .43205 | 2.3146 | .91799 | 38 |
| 23 | .39688 | .43239 | 2.3127 | .91787 | 37 |
| 24 | .39715 | .43274 | 2.3109 | .91775 | 36 |
| 25 | .39741 | .43308 | 2.3090 | .91764 | 35 |
| 26 | .39768 | .43343 | 2.3072 | .91752 | 34 |
| 27 | .39795 | .43378 | 2.3053 | .91741 | 33 |
| 28 | .39822 | .43412 | 2.3035 | .91729 | 32 |
| 29 | .39848 | .43447 | 2.3017 | .91718 | 31 |
| 30 | .39875 | .43481 | 2.2998 | .91706 | 30 |
| 31 | .39902 | .43516 | 2.2980 | .91694 | 29 |
| 32 | .39928 | .43550 | 2.2962 | .91683 | 28 |
| 33 | .39955 | .43585 | 2.2944 | .91671 | 27 |
| 34 | .39982 | .43620 | 2.2925 | .91660 | 26 |
| 35 | .40008 | .43654 | 2.2907 | .91648 | 25 |
| 36 | .40035 | .43689 | 2.2889 | .91636 | 24 |
| 37 | .40062 | .43724 | 2.2871 | .91625 | 23 |
| 38 | .40088 | .43758 | 2.2853 | .91613 | 22 |
| 39 | .40115 | .43793 | 2.2835 | .91601 | 21 |
| 40 | .40141 | .43828 | 2.2817 | .91590 | 20 |
| 41 | .40168 | .43862 | 2.2799 | .91578 | 19 |
| 42 | .40195 | .43897 | 2.2781 | .91566 | 18 |
| 43 | .40221 | .43932 | 2.2763 | .91555 | 17 |
| 44 | .40248 | .43966 | 2.2745 | .91543 | 16 |
| 45 | .40275 | .44001 | 2.2727 | .91531 | 15 |
| 46 | .40301 | .44036 | 2.2709 | .91519 | 14 |
| 47 | .40328 | .44071 | 2.2691 | .91508 | 13 |
| 48 | .40355 | .44105 | 2.2673 | .91496 | 12 |
| 49 | .40381 | .44140 | 2.2655 | .91484 | 11 |
| 50 | .40408 | .44175 | 2.2637 | .91472 | 10 |
| 51 | .40434 | .44210 | 2.2620 | .91461 | 9 |
| 52 | .40461 | .44244 | 2.2602 | .91449 | 8 |
| 53 | .40488 | .44279 | 2.2584 | .91437 | 7 |
| 54 | .40514 | .44314 | 2.2566 | .91425 | 6 |
| 55 | .40541 | .44349 | 2.2549 | .91414 | 5 |
| 56 | .40567 | .44384 | 2.2531 | .91402 | 4 |
| 57 | .40594 | .44418 | 2.2513 | .91390 | 3 |
| 58 | .40621 | .44453 | 2.2496 | .91378 | 2 |
| 59 | .40647 | .44488 | 2.2478 | .91366 | 1 |
| 60 | .40674 | .44523 | 2.2460 | .91355 | 0 |
| | Cos | Cot | Tan | Sin | |

112° (292°)

(247°) 67°

113° (293°)

(246°) 66°

NATURAL FUNCTIONS (Continued)

24° (204°)

(335°) 155°

25° (205°)

(334°) 154°

| | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .40674 | .44523 | 2.2460 | .91355 | 60 |
| 1 | .40700 | .44558 | 2.2443 | .91343 | 59 |
| 2 | .40727 | .44593 | 2.2425 | .91331 | 58 |
| 3 | .40753 | .44627 | 2.2408 | .91319 | 57 |
| 4 | .40780 | .44662 | 2.2390 | .91307 | 56 |
| 5 | .40806 | .44697 | 2.2373 | .91295 | 55 |
| 6 | .40833 | .44732 | 2.2355 | .91283 | 54 |
| 7 | .40860 | .44767 | 2.2338 | .91272 | 53 |
| 8 | .40886 | .44802 | 2.2320 | .91260 | 52 |
| 9 | .40913 | .44837 | 2.2303 | .91248 | 51 |
| 10 | .40939 | .44872 | 2.2286 | .91236 | 50 |
| 11 | .40966 | .44907 | 2.2268 | .91224 | 49 |
| 12 | .40992 | .44942 | 2.2251 | .91212 | 48 |
| 13 | .41019 | .44977 | 2.2234 | .91200 | 47 |
| 14 | .41045 | .45012 | 2.2216 | .91188 | 46 |
| 15 | .41072 | .45047 | 2.2199 | .91176 | 45 |
| 16 | .41098 | .45082 | 2.2182 | .91164 | 44 |
| 17 | .41125 | .45117 | 2.2165 | .91152 | 43 |
| 18 | .41151 | .45152 | 2.2148 | .91140 | 42 |
| 19 | .41178 | .45187 | 2.2130 | .91128 | 41 |
| 20 | .41204 | .45222 | 2.2113 | .91116 | 40 |
| 21 | .41231 | .45257 | 2.2096 | .91104 | 39 |
| 22 | .41257 | .45292 | 2.2079 | .91092 | 38 |
| 23 | .41284 | .45327 | 2.2062 | .91080 | 37 |
| 24 | .41310 | .45362 | 2.2045 | .91068 | 36 |
| 25 | .41337 | .45397 | 2.2028 | .91056 | 35 |
| 26 | .41363 | .45432 | 2.2011 | .91044 | 34 |
| 27 | .41390 | .45467 | 2.1994 | .91032 | 33 |
| 28 | .41416 | .45502 | 2.1977 | .91020 | 32 |
| 29 | .41443 | .45538 | 2.1960 | .91008 | 31 |
| 30 | .41469 | .45573 | 2.1943 | .90996 | 30 |
| 31 | .41496 | .45608 | 2.1926 | .90984 | 29 |
| 32 | .41522 | .45643 | 2.1909 | .90972 | 28 |
| 33 | .41549 | .45678 | 2.1892 | .90960 | 27 |
| 34 | .41575 | .45713 | 2.1876 | .90948 | 26 |
| 35 | .41602 | .45748 | 2.1859 | .90936 | 25 |
| 36 | .41628 | .45784 | 2.1842 | .90924 | 24 |
| 37 | .41655 | .45819 | 2.1825 | .90911 | 23 |
| 38 | .41681 | .45854 | 2.1808 | .90899 | 22 |
| 39 | .41707 | .45889 | 2.1792 | .90887 | 21 |
| 40 | .41734 | .45924 | 2.1775 | .90875 | 20 |
| 41 | .41760 | .45960 | 2.1758 | .90863 | 19 |
| 42 | .41787 | .45995 | 2.1742 | .90851 | 18 |
| 43 | .41813 | .46030 | 2.1725 | .90839 | 17 |
| 44 | .41840 | .46065 | 2.1708 | .90826 | 16 |
| 45 | .41866 | .46101 | 2.1692 | .90814 | 15 |
| 46 | .41892 | .46136 | 2.1675 | .90802 | 14 |
| 47 | .41919 | .46171 | 2.1659 | .90790 | 13 |
| 48 | .41945 | .46206 | 2.1642 | .90778 | 12 |
| 49 | .41972 | .46242 | 2.1625 | .90766 | 11 |
| 50 | .41998 | .46277 | 2.1609 | .90753 | 10 |
| 51 | .42024 | .46312 | 2.1592 | .90741 | 9 |
| 52 | .42051 | .46348 | 2.1576 | .90729 | 8 |
| 53 | .42077 | .46383 | 2.1560 | .90717 | 7 |
| 54 | .42104 | .46418 | 2.1543 | .90704 | 6 |
| 55 | .42130 | .46454 | 2.1527 | .90692 | 5 |
| 56 | .42156 | .46489 | 2.1510 | .90680 | 4 |
| 57 | .42183 | .46525 | 2.1494 | .90668 | 3 |
| 58 | .42209 | .46560 | 2.1478 | .90655 | 2 |
| 59 | .42235 | .46595 | 2.1461 | .90643 | 1 |
| 60 | .42262 | .46631 | 2.1445 | .90631 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

111° (294°)

(245°) 65°

115° (295°)

(244°) 64°

| | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .42262 | .46631 | 2.1445 | .90631 | 60 |
| 1 | .42288 | .46666 | 2.1429 | .90618 | 59 |
| 2 | .42315 | .46702 | 2.1413 | .90606 | 58 |
| 3 | .42341 | .46737 | 2.1396 | .90594 | 57 |
| 4 | .42367 | .46772 | 2.1380 | .90582 | 56 |
| 5 | .42394 | .46808 | 2.1364 | .90569 | 55 |
| 6 | .42420 | .46843 | 2.1348 | .90557 | 54 |
| 7 | .42446 | .46879 | 2.1332 | .90545 | 53 |
| 8 | .42473 | .46914 | 2.1315 | .90532 | 52 |
| 9 | .42499 | .46950 | 2.1299 | .90520 | 51 |
| 10 | .42525 | .46985 | 2.1283 | .90507 | 50 |
| 11 | .42552 | .47021 | 2.1267 | .90495 | 49 |
| 12 | .42578 | .47056 | 2.1251 | .90483 | 48 |
| 13 | .42604 | .47092 | 2.1235 | .90470 | 47 |
| 14 | .42631 | .47128 | 2.1219 | .90458 | 46 |
| 15 | .42657 | .47163 | 2.1203 | .90446 | 45 |
| 16 | .42683 | .47199 | 2.1187 | .90433 | 44 |
| 17 | .42709 | .47234 | 2.1171 | .90421 | 43 |
| 18 | .42736 | .47270 | 2.1155 | .90408 | 42 |
| 19 | .42762 | .47305 | 2.1139 | .90396 | 41 |
| 20 | .42788 | .47341 | 2.1123 | .90383 | 40 |
| 21 | .42815 | .47377 | 2.1107 | .90371 | 39 |
| 22 | .42841 | .47412 | 2.1092 | .90358 | 38 |
| 23 | .42867 | .47448 | 2.1076 | .90346 | 37 |
| 24 | .42894 | .47483 | 2.1060 | .90334 | 36 |
| 25 | .42920 | .47519 | 2.1044 | .90321 | 35 |
| 26 | .42946 | .47555 | 2.1028 | .90309 | 34 |
| 27 | .42972 | .47590 | 2.1013 | .90296 | 33 |
| 28 | .42999 | .47626 | 2.0997 | .90284 | 32 |
| 29 | .43025 | .47662 | 2.0981 | .90271 | 31 |
| 30 | .43051 | .47698 | 2.0965 | .90259 | 30 |
| 31 | .43077 | .47733 | 2.0950 | .90246 | 29 |
| 32 | .43104 | .47769 | 2.0934 | .90233 | 28 |
| 33 | .43130 | .47805 | 2.0918 | .90221 | 27 |
| 34 | .43156 | .47840 | 2.0903 | .90208 | 26 |
| 35 | .43182 | .47876 | 2.0887 | .90196 | 25 |
| 36 | .43209 | .47912 | 2.0872 | .90183 | 24 |
| 37 | .43235 | .47948 | 2.0856 | .90171 | 23 |
| 38 | .43261 | .47984 | 2.0840 | .90158 | 22 |
| 39 | .43287 | .48019 | 2.0825 | .90146 | 21 |
| 40 | .43313 | .48055 | 2.0809 | .90133 | 20 |
| 41 | .43340 | .48091 | 2.0794 | .90120 | 19 |
| 42 | .43366 | .48127 | 2.0778 | .90108 | 18 |
| 43 | .43392 | .48163 | 2.0763 | .90095 | 17 |
| 44 | .43418 | .48198 | 2.0748 | .90082 | 16 |
| 45 | .43445 | .48234 | 2.0732 | .90070 | 15 |
| 46 | .43471 | .48270 | 2.0717 | .90057 | 14 |
| 47 | .43497 | .48306 | 2.0701 | .90045 | 13 |
| 48 | .43523 | .48342 | 2.0686 | .90032 | 12 |
| 49 | .43549 | .48378 | 2.0671 | .90019 | 11 |
| 50 | .43575 | .48414 | 2.0655 | .90007 | 10 |
| 51 | .43602 | .48450 | 2.0640 | .89994 | 9 |
| 52 | .43628 | .48486 | 2.0625 | .89981 | 8 |
| 53 | .43654 | .48521 | 2.0609 | .89968 | 7 |
| 54 | .43680 | .48557 | 2.0594 | .89956 | 6 |
| 55 | .43706 | .48593 | 2.0579 | .89943 | 5 |
| 56 | .43733 | .48629 | 2.0564 | .89930 | 4 |
| 57 | .43759 | .48665 | 2.0549 | .89918 | 3 |
| 58 | .43785 | .48701 | 2.0533 | .89905 | 2 |
| 59 | .43811 | .48737 | 2.0518 | .89892 | 1 |
| 60 | .43837 | .48773 | 2.0503 | .89879 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

NATURAL FUNCTIONS (Continued)

26° (206°)

(333°) 153°

27° (207°)

(332°) 152°

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .43837 | .48773 | 2.0503 | .89879 | 60 |
| 1 | .43863 | .48809 | 2.0488 | .89867 | 59 |
| 2 | .43889 | .48845 | 2.0473 | .89854 | 58 |
| 3 | .43916 | .48881 | 2.0458 | .89841 | 57 |
| 4 | .43942 | .48917 | 2.0443 | .89828 | 56 |
| 5 | .43968 | .48953 | 2.0428 | .89816 | 55 |
| 6 | .43994 | .48989 | 2.0413 | .89803 | 54 |
| 7 | .44020 | .49026 | 2.0398 | .89790 | 53 |
| 8 | .44046 | .49062 | 2.0383 | .89777 | 52 |
| 9 | .44072 | .49098 | 2.0368 | .89764 | 51 |
| 10 | .44098 | .49134 | 2.0353 | .89752 | 50 |
| 11 | .44124 | .49170 | 2.0338 | .89739 | 49 |
| 12 | .44151 | .49206 | 2.0323 | .89726 | 48 |
| 13 | .44177 | .49242 | 2.0308 | .89713 | 47 |
| 14 | .44203 | .49278 | 2.0293 | .89700 | 46 |
| 15 | .44229 | .49315 | 2.0278 | .89687 | 45 |
| 16 | .44255 | .49351 | 2.0263 | .89674 | 44 |
| 17 | .44281 | .49387 | 2.0248 | .89662 | 43 |
| 18 | .44307 | .49423 | 2.0233 | .89649 | 42 |
| 19 | .44333 | .49459 | 2.0219 | .89636 | 41 |
| 20 | .44359 | .49495 | 2.0204 | .89623 | 40 |
| 21 | .44385 | .49532 | 2.0189 | .89610 | 39 |
| 22 | .44411 | .49568 | 2.0174 | .89597 | 38 |
| 23 | .44437 | .49604 | 2.0160 | .89584 | 37 |
| 24 | .44464 | .49640 | 2.0145 | .89571 | 36 |
| 25 | .44490 | .49677 | 2.0130 | .89558 | 35 |
| 26 | .44516 | .49713 | 2.0115 | .89545 | 34 |
| 27 | .44542 | .49749 | 2.0101 | .89532 | 33 |
| 28 | .44568 | .49786 | 2.0086 | .89519 | 32 |
| 29 | .44594 | .49822 | 2.0072 | .89506 | 31 |
| 30 | .44620 | .49858 | 2.0057 | .89493 | 30 |
| 31 | .44646 | .49894 | 2.0042 | .89480 | 29 |
| 32 | .44672 | .49931 | 2.0028 | .89467 | 28 |
| 33 | .44698 | .49967 | 2.0013 | .89454 | 27 |
| 34 | .44724 | .50004 | 1.9999 | .89441 | 26 |
| 35 | .44750 | .50040 | 1.9984 | .89428 | 25 |
| 36 | .44776 | .50076 | 1.9970 | .89415 | 24 |
| 37 | .44802 | .50113 | 1.9955 | .89402 | 23 |
| 38 | .44828 | .50149 | 1.9941 | .89389 | 22 |
| 39 | .44854 | .50185 | 1.9926 | .89376 | 21 |
| 40 | .44880 | .50222 | 1.9912 | .89363 | 20 |
| 41 | .44906 | .50258 | 1.9897 | .89350 | 19 |
| 42 | .44932 | .50295 | 1.9883 | .89337 | 18 |
| 43 | .44958 | .50331 | 1.9868 | .89324 | 17 |
| 44 | .44984 | .50368 | 1.9854 | .89311 | 16 |
| 45 | .45010 | .50404 | 1.9840 | .89298 | 15 |
| 46 | .45036 | .50441 | 1.9825 | .89285 | 14 |
| 47 | .45062 | .50477 | 1.9811 | .89272 | 13 |
| 48 | .45088 | .50514 | 1.9797 | .89259 | 12 |
| 49 | .45114 | .50550 | 1.9782 | .89245 | 11 |
| 50 | .45140 | .50587 | 1.9768 | .89232 | 10 |
| 51 | .45166 | .50623 | 1.9754 | .89219 | 9 |
| 52 | .45192 | .50660 | 1.9740 | .89206 | 8 |
| 53 | .45218 | .50696 | 1.9725 | .89193 | 7 |
| 54 | .45243 | .50733 | 1.9711 | .89180 | 6 |
| 55 | .45269 | .50769 | 1.9697 | .89167 | 5 |
| 56 | .45295 | .50806 | 1.9683 | .89153 | 4 |
| 57 | .45321 | .50843 | 1.9669 | .89140 | 3 |
| 58 | .45347 | .50879 | 1.9654 | .89127 | 2 |
| 59 | .45373 | .50916 | 1.9640 | .89114 | 1 |
| 60 | .45399 | .50953 | 1.9626 | .89101 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .45399 | .50953 | 1.9626 | .89101 | 60 |
| 1 | .45425 | .50989 | 1.9612 | .89087 | 59 |
| 2 | .45451 | .51026 | 1.9598 | .89074 | 58 |
| 3 | .45477 | .51063 | 1.9584 | .89061 | 57 |
| 4 | .45503 | .51099 | 1.9570 | .89048 | 56 |
| 5 | .45529 | .51136 | 1.9556 | .89035 | 55 |
| 6 | .45554 | .51173 | 1.9542 | .89021 | 54 |
| 7 | .45580 | .51209 | 1.9528 | .89008 | 53 |
| 8 | .45606 | .51246 | 1.9514 | .88995 | 52 |
| 9 | .45632 | .51283 | 1.9500 | .88981 | 51 |
| 10 | .45658 | .51319 | 1.9486 | .88968 | 50 |
| 11 | .45684 | .51356 | 1.9472 | .88955 | 49 |
| 12 | .45710 | .51393 | 1.9458 | .88942 | 48 |
| 13 | .45736 | .51430 | 1.9444 | .88928 | 47 |
| 14 | .45762 | .51467 | 1.9430 | .88915 | 46 |
| 15 | .45787 | .51503 | 1.9416 | .88902 | 45 |
| 16 | .45813 | .51540 | 1.9402 | .88888 | 44 |
| 17 | .45839 | .51577 | 1.9388 | .88875 | 43 |
| 18 | .45865 | .51614 | 1.9375 | .88862 | 42 |
| 19 | .45891 | .51651 | 1.9361 | .88848 | 41 |
| 20 | .45917 | .51688 | 1.9347 | .88835 | 40 |
| 21 | .45942 | .51724 | 1.9333 | .88822 | 39 |
| 22 | .45968 | .51761 | 1.9319 | .88808 | 38 |
| 23 | .45994 | .51798 | 1.9306 | .88795 | 37 |
| 24 | .46020 | .51835 | 1.9292 | .88782 | 36 |
| 25 | .46046 | .51872 | 1.9278 | .88768 | 35 |
| 26 | .46072 | .51909 | 1.9265 | .88755 | 34 |
| 27 | .46097 | .51946 | 1.9251 | .88741 | 33 |
| 28 | .46123 | .51983 | 1.9237 | .88728 | 32 |
| 29 | .46149 | .52020 | 1.9223 | .88715 | 31 |
| 30 | .46175 | .52057 | 1.9210 | .88701 | 30 |
| 31 | .46201 | .52094 | 1.9196 | .88688 | 29 |
| 32 | .46226 | .52131 | 1.9183 | .88674 | 28 |
| 33 | .46252 | .52168 | 1.9169 | .88661 | 27 |
| 34 | .46278 | .52205 | 1.9155 | .88647 | 26 |
| 35 | .46304 | .52242 | 1.9142 | .88634 | 25 |
| 36 | .46330 | .52279 | 1.9128 | .88620 | 24 |
| 37 | .46355 | .52316 | 1.9115 | .88607 | 23 |
| 38 | .46381 | .52353 | 1.9101 | .88593 | 22 |
| 39 | .46407 | .52390 | 1.9088 | .88580 | 21 |
| 40 | .46433 | .52427 | 1.9074 | .88566 | 20 |
| 41 | .46458 | .52464 | 1.9061 | .88553 | 19 |
| 42 | .46484 | .52501 | 1.9047 | .88539 | 18 |
| 43 | .46510 | .52538 | 1.9034 | .88526 | 17 |
| 44 | .46536 | .52575 | 1.9020 | .88512 | 16 |
| 45 | .46561 | .52613 | 1.9007 | .88499 | 15 |
| 46 | .46587 | .52650 | 1.8993 | .88485 | 14 |
| 47 | .46613 | .52687 | 1.8980 | .88472 | 13 |
| 48 | .46639 | .52724 | 1.8967 | .88458 | 12 |
| 49 | .46664 | .52761 | 1.8953 | .88445 | 11 |
| 50 | .46690 | .52798 | 1.8940 | .88431 | 10 |
| 51 | .46716 | .52836 | 1.8927 | .88417 | 9 |
| 52 | .46742 | .52873 | 1.8913 | .88404 | 8 |
| 53 | .46767 | .52910 | 1.8900 | .88390 | 7 |
| 54 | .46793 | .52947 | 1.8887 | .88377 | 6 |
| 55 | .46819 | .52985 | 1.8873 | .88363 | 5 |
| 56 | .46844 | .53022 | 1.8860 | .88349 | 4 |
| 57 | .46870 | .53059 | 1.8847 | .88336 | 3 |
| 58 | .46896 | .53096 | 1.8834 | .88322 | 2 |
| 59 | .46921 | .53134 | 1.8820 | .88308 | 1 |
| 60 | .46947 | .53171 | 1.8807 | .88295 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

116° (296°)

(243°) 63°

117° (297°)

(242°) 62°

NATURAL FUNCTIONS (Continued)

28° (208°)

(331°) 151°

29° (209°)

(330°) 150°

| | Sin | Tan | Cot | Cos | |
|----|--------|--------|--------|--------|----|
| 0 | .46947 | .53171 | 1.8807 | .88295 | 60 |
| 1 | .46973 | .53208 | 1.8794 | .88281 | 59 |
| 2 | .46999 | .53246 | 1.8781 | .88267 | 58 |
| 3 | .47024 | .53283 | 1.8768 | .88254 | 57 |
| 4 | .47050 | .53320 | 1.8755 | .88240 | 56 |
| 5 | .47076 | .53358 | 1.8741 | .88226 | 55 |
| 6 | .47101 | .53395 | 1.8728 | .88213 | 54 |
| 7 | .47127 | .53432 | 1.8715 | .88199 | 53 |
| 8 | .47153 | .53470 | 1.8702 | .88185 | 52 |
| 9 | .47178 | .53507 | 1.8689 | .88172 | 51 |
| 10 | .47204 | .53545 | 1.8676 | .88158 | 50 |
| 11 | .47229 | .53582 | 1.8663 | .88144 | 49 |
| 12 | .47255 | .53620 | 1.8650 | .88130 | 48 |
| 13 | .47281 | .53657 | 1.8637 | .88117 | 47 |
| 14 | .47306 | .53694 | 1.8624 | .88103 | 46 |
| 15 | .47332 | .53732 | 1.8611 | .88089 | 45 |
| 16 | .47358 | .53769 | 1.8598 | .88075 | 44 |
| 17 | .47383 | .53807 | 1.8585 | .88062 | 43 |
| 18 | .47409 | .53844 | 1.8572 | .88048 | 42 |
| 19 | .47434 | .53882 | 1.8559 | .88034 | 41 |
| 20 | .47460 | .53920 | 1.8546 | .88020 | 40 |
| 21 | .47486 | .53957 | 1.8533 | .88006 | 39 |
| 22 | .47511 | .53995 | 1.8520 | .87993 | 38 |
| 23 | .47537 | .54032 | 1.8507 | .87979 | 37 |
| 24 | .47562 | .54070 | 1.8495 | .87965 | 36 |
| 25 | .47588 | .54107 | 1.8482 | .87951 | 35 |
| 26 | .47614 | .54145 | 1.8469 | .87937 | 34 |
| 27 | .47639 | .54183 | 1.8456 | .87923 | 33 |
| 28 | .47665 | .54220 | 1.8443 | .87909 | 32 |
| 29 | .47690 | .54258 | 1.8430 | .87896 | 31 |
| 30 | .47716 | .54296 | 1.8418 | .87882 | 30 |
| 31 | .47741 | .54333 | 1.8405 | .87868 | 29 |
| 32 | .47767 | .54371 | 1.8392 | .87854 | 28 |
| 33 | .47793 | .54409 | 1.8379 | .87840 | 27 |
| 34 | .47818 | .54446 | 1.8367 | .87826 | 26 |
| 35 | .47844 | .54484 | 1.8354 | .87812 | 25 |
| 36 | .47869 | .54522 | 1.8341 | .87798 | 24 |
| 37 | .47895 | .54560 | 1.8329 | .87784 | 23 |
| 38 | .47920 | .54597 | 1.8316 | .87770 | 22 |
| 39 | .47946 | .54635 | 1.8303 | .87756 | 21 |
| 40 | .47971 | .54673 | 1.8291 | .87743 | 20 |
| 41 | .47997 | .54711 | 1.8278 | .87729 | 19 |
| 42 | .48022 | .54748 | 1.8265 | .87715 | 18 |
| 43 | .48048 | .54786 | 1.8253 | .87701 | 17 |
| 44 | .48073 | .54824 | 1.8240 | .87687 | 16 |
| 45 | .48099 | .54862 | 1.8228 | .87673 | 15 |
| 46 | .48124 | .54900 | 1.8215 | .87659 | 14 |
| 47 | .48150 | .54938 | 1.8202 | .87645 | 13 |
| 48 | .48175 | .54975 | 1.8190 | .87631 | 12 |
| 49 | .48201 | .55013 | 1.8177 | .87617 | 11 |
| 50 | .48226 | .55051 | 1.8165 | .87603 | 10 |
| 51 | .48252 | .55089 | 1.8152 | .87589 | 9 |
| 52 | .48277 | .55127 | 1.8140 | .87575 | 8 |
| 53 | .48303 | .55165 | 1.8127 | .87561 | 7 |
| 54 | .48328 | .55203 | 1.8115 | .87546 | 6 |
| 55 | .48354 | .55241 | 1.8103 | .87532 | 5 |
| 56 | .48379 | .55279 | 1.8090 | .87518 | 4 |
| 57 | .48405 | .55317 | 1.8078 | .87504 | 3 |
| 58 | .48430 | .55355 | 1.8065 | .87490 | 2 |
| 59 | .48456 | .55393 | 1.8053 | .87476 | 1 |
| 60 | .48481 | .55431 | 1.8040 | .87462 | 0 |
| | Cos | Cot | Tan | Sin | |

| | Sin | Tan | Cot | Cos | |
|----|--------|--------|--------|--------|----|
| 0 | .48481 | .55431 | 1.8040 | .87462 | 60 |
| 1 | .48506 | .55469 | 1.8028 | .87448 | 59 |
| 2 | .48532 | .55507 | 1.8016 | .87434 | 58 |
| 3 | .48557 | .55545 | 1.8003 | .87420 | 57 |
| 4 | .48583 | .55583 | 1.7991 | .87406 | 56 |
| 5 | .48608 | .55621 | 1.7979 | .87391 | 55 |
| 6 | .48634 | .55659 | 1.7966 | .87377 | 54 |
| 7 | .48659 | .55697 | 1.7954 | .87363 | 53 |
| 8 | .48684 | .55736 | 1.7942 | .87349 | 52 |
| 9 | .48710 | .55774 | 1.7930 | .87335 | 51 |
| 10 | .48735 | .55812 | 1.7917 | .87321 | 50 |
| 11 | .48761 | .55850 | 1.7905 | .87306 | 49 |
| 12 | .48786 | .55888 | 1.7893 | .87292 | 48 |
| 13 | .48811 | .55926 | 1.7881 | .87278 | 47 |
| 14 | .48837 | .55964 | 1.7868 | .87264 | 46 |
| 15 | .48862 | .56003 | 1.7856 | .87250 | 45 |
| 16 | .48888 | .56041 | 1.7844 | .87235 | 44 |
| 17 | .48913 | .56079 | 1.7832 | .87221 | 43 |
| 18 | .48938 | .56117 | 1.7820 | .87207 | 42 |
| 19 | .48964 | .56156 | 1.7808 | .87193 | 41 |
| 20 | .48989 | .56194 | 1.7796 | .87178 | 40 |
| 21 | .49014 | .56232 | 1.7783 | .87164 | 39 |
| 22 | .49040 | .56270 | 1.7771 | .87150 | 38 |
| 23 | .49065 | .56309 | 1.7759 | .87136 | 37 |
| 24 | .49090 | .56347 | 1.7747 | .87121 | 36 |
| 25 | .49116 | .56385 | 1.7735 | .87107 | 35 |
| 26 | .49141 | .56424 | 1.7723 | .87093 | 34 |
| 27 | .49166 | .56462 | 1.7711 | .87079 | 33 |
| 28 | .49192 | .56501 | 1.7699 | .87064 | 32 |
| 29 | .49217 | .56539 | 1.7687 | .87050 | 31 |
| 30 | .49242 | .56577 | 1.7675 | .87036 | 30 |
| 31 | .49268 | .56616 | 1.7663 | .87021 | 29 |
| 32 | .49293 | .56654 | 1.7651 | .87007 | 28 |
| 33 | .49318 | .56693 | 1.7639 | .86993 | 27 |
| 34 | .49344 | .56731 | 1.7627 | .86978 | 26 |
| 35 | .49369 | .56769 | 1.7615 | .86964 | 25 |
| 36 | .49394 | .56808 | 1.7603 | .86949 | 24 |
| 37 | .49419 | .56846 | 1.7591 | .86935 | 23 |
| 38 | .49445 | .56885 | 1.7579 | .86921 | 22 |
| 39 | .49470 | .56923 | 1.7567 | .86906 | 21 |
| 40 | .49495 | .56962 | 1.7556 | .86892 | 20 |
| 41 | .49521 | .57000 | 1.7544 | .86878 | 19 |
| 42 | .49546 | .57039 | 1.7532 | .86863 | 18 |
| 43 | .49571 | .57078 | 1.7520 | .86849 | 17 |
| 44 | .49596 | .57116 | 1.7508 | .86834 | 16 |
| 45 | .49622 | .57155 | 1.7496 | .86820 | 15 |
| 46 | .49647 | .57193 | 1.7485 | .86805 | 14 |
| 47 | .49672 | .57232 | 1.7473 | .86791 | 13 |
| 48 | .49697 | .57271 | 1.7461 | .86777 | 12 |
| 49 | .49723 | .57309 | 1.7449 | .86762 | 11 |
| 50 | .49748 | .57348 | 1.7437 | .86748 | 10 |
| 51 | .49773 | .57386 | 1.7426 | .86733 | 9 |
| 52 | .49798 | .57425 | 1.7414 | .86719 | 8 |
| 53 | .49824 | .57464 | 1.7402 | .86704 | 7 |
| 54 | .49849 | .57503 | 1.7391 | .86690 | 6 |
| 55 | .49874 | .57541 | 1.7379 | .86675 | 5 |
| 56 | .49899 | .57580 | 1.7367 | .86661 | 4 |
| 57 | .49924 | .57619 | 1.7355 | .86646 | 3 |
| 58 | .49950 | .57657 | 1.7344 | .86632 | 2 |
| 59 | .49975 | .57696 | 1.7332 | .86617 | 1 |
| 60 | .50000 | .57735 | 1.7321 | .86603 | 0 |
| | Cos | Cot | Tan | Sin | |

118° (298°)

(241°) 61°

119° (299°)

(240°) 60°

NATURAL FUNCTIONS (Continued)

30° (210°)

(329°) 149°

31° (211°)

(328°) 148°

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .50000 | .57735 | 1.7321 | .86603 | 60 |
| 1 | .50025 | .57774 | 1.7309 | .86588 | 59 |
| 2 | .50050 | .57813 | 1.7297 | .86573 | 58 |
| 3 | .50076 | .57851 | 1.7286 | .86559 | 57 |
| 4 | .50101 | .57890 | 1.7274 | .86544 | 56 |
| 5 | .50126 | .57929 | 1.7262 | .86530 | 55 |
| 6 | .50151 | .57968 | 1.7251 | .86515 | 54 |
| 7 | .50176 | .58007 | 1.7239 | .86501 | 53 |
| 8 | .50201 | .58046 | 1.7228 | .86486 | 52 |
| 9 | .50227 | .58085 | 1.7216 | .86471 | 51 |
| 10 | .50252 | .58124 | 1.7205 | .86457 | 50 |
| 11 | .50277 | .58162 | 1.7193 | .86442 | 49 |
| 12 | .50302 | .58201 | 1.7182 | .86427 | 48 |
| 13 | .50327 | .58240 | 1.7170 | .86413 | 47 |
| 14 | .50352 | .58279 | 1.7159 | .86398 | 46 |
| 15 | .50377 | .58318 | 1.7147 | .86384 | 45 |
| 16 | .50403 | .58357 | 1.7136 | .86369 | 44 |
| 17 | .50428 | .58396 | 1.7124 | .86354 | 43 |
| 18 | .50453 | .58435 | 1.7113 | .86340 | 42 |
| 19 | .50478 | .58474 | 1.7102 | .86325 | 41 |
| 20 | .50503 | .58513 | 1.7090 | .86310 | 40 |
| 21 | .50528 | .58552 | 1.7079 | .86295 | 39 |
| 22 | .50553 | .58591 | 1.7067 | .86281 | 38 |
| 23 | .50578 | .58631 | 1.7056 | .86266 | 37 |
| 24 | .50603 | .58670 | 1.7045 | .86251 | 36 |
| 25 | .50628 | .58709 | 1.7033 | .86237 | 35 |
| 26 | .50654 | .58748 | 1.7022 | .86222 | 34 |
| 27 | .50679 | .58787 | 1.7011 | .86207 | 33 |
| 28 | .50704 | .58826 | 1.6999 | .86192 | 32 |
| 29 | .50729 | .58865 | 1.6988 | .86178 | 31 |
| 30 | .50754 | .58905 | 1.6977 | .86163 | 30 |
| 31 | .50779 | .58944 | 1.6965 | .86148 | 29 |
| 32 | .50804 | .58983 | 1.6954 | .86133 | 28 |
| 33 | .50829 | .59022 | 1.6943 | .86119 | 27 |
| 34 | .50854 | .59061 | 1.6932 | .86104 | 26 |
| 35 | .50879 | .59101 | 1.6920 | .86089 | 25 |
| 36 | .50904 | .59140 | 1.6909 | .86074 | 24 |
| 37 | .50929 | .59179 | 1.6898 | .86059 | 23 |
| 38 | .50954 | .59218 | 1.6887 | .86045 | 22 |
| 39 | .50979 | .59258 | 1.6875 | .86030 | 21 |
| 40 | .51004 | .59297 | 1.6864 | .86015 | 20 |
| 41 | .51029 | .59336 | 1.6853 | .86000 | 19 |
| 42 | .51054 | .59376 | 1.6842 | .85985 | 18 |
| 43 | .51079 | .59415 | 1.6831 | .85970 | 17 |
| 44 | .51104 | .59454 | 1.6820 | .85956 | 16 |
| 45 | .51129 | .59494 | 1.6808 | .85941 | 15 |
| 46 | .51154 | .59533 | 1.6797 | .85926 | 14 |
| 47 | .51179 | .59573 | 1.6786 | .85911 | 13 |
| 48 | .51204 | .59612 | 1.6775 | .85896 | 12 |
| 49 | .51229 | .59651 | 1.6764 | .85881 | 11 |
| 50 | .51254 | .59691 | 1.6753 | .85866 | 10 |
| 51 | .51279 | .59730 | 1.6742 | .85851 | 9 |
| 52 | .51304 | .59770 | 1.6731 | .85836 | 8 |
| 53 | .51329 | .59809 | 1.6720 | .85821 | 7 |
| 54 | .51354 | .59849 | 1.6709 | .85806 | 6 |
| 55 | .51379 | .59888 | 1.6698 | .85792 | 5 |
| 56 | .51404 | .59928 | 1.6687 | .85777 | 4 |
| 57 | .51429 | .59967 | 1.6676 | .85762 | 3 |
| 58 | .51454 | .60007 | 1.6665 | .85747 | 2 |
| 59 | .51479 | .60046 | 1.6654 | .85732 | 1 |
| 60 | .51504 | .60086 | 1.6643 | .85717 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .51504 | .60086 | 1.6643 | .85717 | 60 |
| 1 | .51529 | .60126 | 1.6632 | .85702 | 59 |
| 2 | .51554 | .60165 | 1.6621 | .85687 | 58 |
| 3 | .51579 | .60205 | 1.6610 | .85672 | 57 |
| 4 | .51604 | .60245 | 1.6599 | .85657 | 56 |
| 5 | .51628 | .60284 | 1.6588 | .85642 | 55 |
| 6 | .51653 | .60324 | 1.6577 | .85627 | 54 |
| 7 | .51678 | .60364 | 1.6566 | .85612 | 53 |
| 8 | .51703 | .60403 | 1.6555 | .85597 | 52 |
| 9 | .51728 | .60443 | 1.6545 | .85582 | 51 |
| 10 | .51753 | .60483 | 1.6534 | .85567 | 50 |
| 11 | .51778 | .60522 | 1.6523 | .85551 | 49 |
| 12 | .51803 | .60562 | 1.6512 | .85536 | 48 |
| 13 | .51828 | .60602 | 1.6501 | .85521 | 47 |
| 14 | .51852 | .60642 | 1.6490 | .85506 | 46 |
| 15 | .51877 | .60681 | 1.6479 | .85491 | 45 |
| 16 | .51902 | .60721 | 1.6469 | .85476 | 44 |
| 17 | .51927 | .60761 | 1.6458 | .85461 | 43 |
| 18 | .51952 | .60801 | 1.6447 | .85446 | 42 |
| 19 | .51977 | .60841 | 1.6436 | .85431 | 41 |
| 20 | .52002 | .60881 | 1.6426 | .85416 | 40 |
| 21 | .52026 | .60921 | 1.6415 | .85401 | 39 |
| 22 | .52051 | .60960 | 1.6404 | .85386 | 38 |
| 23 | .52076 | .61000 | 1.6393 | .85370 | 37 |
| 24 | .52101 | .61040 | 1.6383 | .85355 | 36 |
| 25 | .52126 | .61080 | 1.6372 | .85340 | 35 |
| 26 | .52151 | .61120 | 1.6361 | .85325 | 34 |
| 27 | .52175 | .61160 | 1.6351 | .85310 | 33 |
| 28 | .52200 | .61200 | 1.6340 | .85294 | 32 |
| 29 | .52225 | .61240 | 1.6329 | .85279 | 31 |
| 30 | .52250 | .61280 | 1.6319 | .85264 | 30 |
| 31 | .52275 | .61320 | 1.6308 | .85249 | 29 |
| 32 | .52299 | .61360 | 1.6297 | .85234 | 28 |
| 33 | .52324 | .61400 | 1.6287 | .85218 | 27 |
| 34 | .52349 | .61440 | 1.6276 | .85203 | 26 |
| 35 | .52374 | .61480 | 1.6265 | .85188 | 25 |
| 36 | .52399 | .61520 | 1.6255 | .85173 | 24 |
| 37 | .52423 | .61561 | 1.6244 | .85157 | 23 |
| 38 | .52448 | .61601 | 1.6234 | .85142 | 22 |
| 39 | .52473 | .61641 | 1.6223 | .85127 | 21 |
| 40 | .52498 | .61681 | 1.6212 | .85112 | 20 |
| 41 | .52522 | .61721 | 1.6202 | .85096 | 19 |
| 42 | .52547 | .61761 | 1.6191 | .85081 | 18 |
| 43 | .52572 | .61801 | 1.6181 | .85066 | 17 |
| 44 | .52597 | .61842 | 1.6170 | .85051 | 16 |
| 45 | .52621 | .61882 | 1.6160 | .85035 | 15 |
| 46 | .52646 | .61922 | 1.6149 | .85020 | 14 |
| 47 | .52671 | .61962 | 1.6139 | .85005 | 13 |
| 48 | .52696 | .62003 | 1.6128 | .84989 | 12 |
| 49 | .52720 | .62043 | 1.6118 | .84974 | 11 |
| 50 | .52745 | .62083 | 1.6107 | .84959 | 10 |
| 51 | .52770 | .62124 | 1.6097 | .84943 | 9 |
| 52 | .52794 | .62164 | 1.6087 | .84928 | 8 |
| 53 | .52819 | .62204 | 1.6076 | .84913 | 7 |
| 54 | .52844 | .62245 | 1.6066 | .84897 | 6 |
| 55 | .52869 | .62285 | 1.6055 | .84882 | 5 |
| 56 | .52893 | .62325 | 1.6045 | .84866 | 4 |
| 57 | .52918 | .62366 | 1.6034 | .84851 | 3 |
| 58 | .52943 | .62406 | 1.6024 | .84836 | 2 |
| 59 | .52967 | .62446 | 1.6014 | .84820 | 1 |
| 60 | .52992 | .62487 | 1.6003 | .84805 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

120° (300°)

(239°) 59°

121° (301°)

(238°) 58°

NATURAL FUNCTIONS (Continued)

32° (212°)

(327°) 147°

33° (213°)

(326°) 146°

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .52992 | .62487 | 1.6003 | .84805 | 60 |
| 1 | .53017 | .62527 | 1.5993 | .84789 | 59 |
| 2 | .53041 | .62568 | 1.5983 | .84774 | 58 |
| 3 | .53066 | .62608 | 1.5972 | .84759 | 57 |
| 4 | .53091 | .62649 | 1.5962 | .84743 | 56 |
| 5 | .53115 | .62689 | 1.5952 | .84728 | 55 |
| 6 | .53140 | .62730 | 1.5941 | .84712 | 54 |
| 7 | .53164 | .62770 | 1.5931 | .84697 | 53 |
| 8 | .53189 | .62811 | 1.5921 | .84681 | 52 |
| 9 | .53214 | .62852 | 1.5911 | .84666 | 51 |
| 10 | .53238 | .62892 | 1.5900 | .84650 | 50 |
| 11 | .53263 | .62933 | 1.5890 | .84635 | 49 |
| 12 | .53288 | .62973 | 1.5880 | .84619 | 48 |
| 13 | .53312 | .63014 | 1.5869 | .84604 | 47 |
| 14 | .53337 | .63055 | 1.5859 | .84588 | 46 |
| 15 | .53361 | .63095 | 1.5849 | .84573 | 45 |
| 16 | .53386 | .63136 | 1.5839 | .84557 | 44 |
| 17 | .53411 | .63177 | 1.5829 | .84542 | 43 |
| 18 | .53435 | .63217 | 1.5818 | .84526 | 42 |
| 19 | .53460 | .63258 | 1.5808 | .84511 | 41 |
| 20 | .53484 | .63299 | 1.5798 | .84495 | 40 |
| 21 | .53509 | .63340 | 1.5788 | .84480 | 39 |
| 22 | .53534 | .63380 | 1.5778 | .84464 | 38 |
| 23 | .53558 | .63421 | 1.5768 | .84448 | 37 |
| 24 | .53583 | .63462 | 1.5757 | .84433 | 36 |
| 25 | .53607 | .63503 | 1.5747 | .84417 | 35 |
| 26 | .53632 | .63544 | 1.5737 | .84402 | 34 |
| 27 | .53656 | .63584 | 1.5727 | .84386 | 33 |
| 28 | .53681 | .63625 | 1.5717 | .84370 | 32 |
| 29 | .53705 | .63666 | 1.5707 | .84355 | 31 |
| 30 | .53730 | .63707 | 1.5697 | .84339 | 30 |
| 31 | .53754 | .63748 | 1.5687 | .84324 | 29 |
| 32 | .53779 | .63789 | 1.5677 | .84308 | 28 |
| 33 | .53804 | .63830 | 1.5667 | .84292 | 27 |
| 34 | .53828 | .63871 | 1.5657 | .84277 | 26 |
| 35 | .53853 | .63912 | 1.5647 | .84261 | 25 |
| 36 | .53877 | .63953 | 1.5637 | .84245 | 24 |
| 37 | .53902 | .63994 | 1.5627 | .84230 | 23 |
| 38 | .53926 | .64035 | 1.5617 | .84214 | 22 |
| 39 | .53951 | .64076 | 1.5607 | .84198 | 21 |
| 40 | .53975 | .64117 | 1.5597 | .84182 | 20 |
| 41 | .54000 | .64158 | 1.5587 | .84167 | 19 |
| 42 | .54024 | .64199 | 1.5577 | .84151 | 18 |
| 43 | .54049 | .64240 | 1.5567 | .84135 | 17 |
| 44 | .54073 | .64281 | 1.5557 | .84120 | 16 |
| 45 | .54097 | .64322 | 1.5547 | .84104 | 15 |
| 46 | .54122 | .64363 | 1.5537 | .84088 | 14 |
| 47 | .54146 | .64404 | 1.5527 | .84072 | 13 |
| 48 | .54171 | .64446 | 1.5517 | .84057 | 12 |
| 49 | .54195 | .64487 | 1.5507 | .84041 | 11 |
| 50 | .54220 | .64528 | 1.5497 | .84025 | 10 |
| 51 | .54244 | .64569 | 1.5487 | .84009 | 9 |
| 52 | .54269 | .64610 | 1.5477 | .83994 | 8 |
| 53 | .54293 | .64652 | 1.5468 | .83978 | 7 |
| 54 | .54317 | .64693 | 1.5458 | .83962 | 6 |
| 55 | .54342 | .64734 | 1.5448 | .83946 | 5 |
| 56 | .54366 | .64775 | 1.5438 | .83930 | 4 |
| 57 | .54391 | .64817 | 1.5428 | .83915 | 3 |
| 58 | .54415 | .64858 | 1.5418 | .83899 | 2 |
| 59 | .54440 | .64899 | 1.5408 | .83883 | 1 |
| 60 | .54464 | .64941 | 1.5399 | .83867 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .54464 | .64941 | 1.5399 | .83867 | 60 |
| 1 | .54488 | .64982 | 1.5389 | .83851 | 59 |
| 2 | .54513 | .65024 | 1.5379 | .83835 | 58 |
| 3 | .54537 | .65065 | 1.5369 | .83819 | 57 |
| 4 | .54561 | .65106 | 1.5359 | .83804 | 56 |
| 5 | .54586 | .65148 | 1.5350 | .83788 | 55 |
| 6 | .54610 | .65189 | 1.5340 | .83772 | 54 |
| 7 | .54635 | .65231 | 1.5330 | .83756 | 53 |
| 8 | .54659 | .65272 | 1.5320 | .83740 | 52 |
| 9 | .54683 | .65314 | 1.5311 | .83724 | 51 |
| 10 | .54708 | .65355 | 1.5301 | .83708 | 50 |
| 11 | .54732 | .65397 | 1.5291 | .83692 | 49 |
| 12 | .54756 | .65438 | 1.5282 | .83676 | 48 |
| 13 | .54781 | .65480 | 1.5272 | .83660 | 47 |
| 14 | .54805 | .65521 | 1.5262 | .83645 | 46 |
| 15 | .54829 | .65563 | 1.5253 | .83629 | 45 |
| 16 | .54854 | .65604 | 1.5243 | .83613 | 44 |
| 17 | .54878 | .65646 | 1.5233 | .83597 | 43 |
| 18 | .54902 | .65688 | 1.5224 | .83581 | 42 |
| 19 | .54927 | .65729 | 1.5214 | .83565 | 41 |
| 20 | .54951 | .65771 | 1.5204 | .83549 | 40 |
| 21 | .54975 | .65813 | 1.5195 | .83533 | 39 |
| 22 | .54999 | .65854 | 1.5185 | .83517 | 38 |
| 23 | .55024 | .65896 | 1.5175 | .83501 | 37 |
| 24 | .55048 | .65938 | 1.5166 | .83485 | 36 |
| 25 | .55072 | .65980 | 1.5156 | .83469 | 35 |
| 26 | .55097 | .66021 | 1.5147 | .83453 | 34 |
| 27 | .55121 | .66063 | 1.5137 | .83437 | 33 |
| 28 | .55145 | .66105 | 1.5127 | .83421 | 32 |
| 29 | .55169 | .66147 | 1.5118 | .83405 | 31 |
| 30 | .55194 | .66189 | 1.5108 | .83389 | 30 |
| 31 | .55218 | .66230 | 1.5099 | .83373 | 29 |
| 32 | .55242 | .66272 | 1.5089 | .83357 | 28 |
| 33 | .55266 | .66314 | 1.5080 | .83341 | 27 |
| 34 | .55291 | .66356 | 1.5070 | .83324 | 26 |
| 35 | .55315 | .66398 | 1.5061 | .83308 | 25 |
| 36 | .55339 | .66440 | 1.5051 | .83292 | 24 |
| 37 | .55363 | .66482 | 1.5042 | .83276 | 23 |
| 38 | .55388 | .66524 | 1.5032 | .83260 | 22 |
| 39 | .55412 | .66566 | 1.5023 | .83244 | 21 |
| 40 | .55436 | .66608 | 1.5013 | .83228 | 20 |
| 41 | .55460 | .66650 | 1.5004 | .83212 | 19 |
| 42 | .55484 | .66692 | 1.4994 | .83195 | 18 |
| 43 | .55509 | .66734 | 1.4985 | .83179 | 17 |
| 44 | .55533 | .66776 | 1.4975 | .83163 | 16 |
| 45 | .55557 | .66818 | 1.4966 | .83147 | 15 |
| 46 | .55581 | .66860 | 1.4957 | .83131 | 14 |
| 47 | .55605 | .66902 | 1.4947 | .83115 | 13 |
| 48 | .55630 | .66944 | 1.4938 | .83098 | 12 |
| 49 | .55654 | .66986 | 1.4928 | .83082 | 11 |
| 50 | .55678 | .67028 | 1.4919 | .83066 | 10 |
| 51 | .55702 | .67071 | 1.4910 | .83050 | 9 |
| 52 | .55726 | .67113 | 1.4900 | .83034 | 8 |
| 53 | .55750 | .67155 | 1.4891 | .83017 | 7 |
| 54 | .55775 | .67197 | 1.4882 | .83001 | 6 |
| 55 | .55799 | .67239 | 1.4872 | .82985 | 5 |
| 56 | .55823 | .67282 | 1.4863 | .82969 | 4 |
| 57 | .55847 | .67324 | 1.4854 | .82953 | 3 |
| 58 | .55871 | .67366 | 1.4844 | .82936 | 2 |
| 59 | .55895 | .67409 | 1.4835 | .82920 | 1 |
| 60 | .55919 | .67451 | 1.4826 | .82904 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

122° (302°)

(237°) 57°

123° (303°)

(236°) 56°

NATURAL FUNCTIONS (Continued)

34° (214°)

(325°) 145°

35° (215°)

(324°) 144°

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .55919 | .67451 | 1.4826 | .82904 | 60 |
| 1 | .55943 | .67493 | 1.4816 | .82887 | 59 |
| 2 | .55968 | .67536 | 1.4807 | .82871 | 58 |
| 3 | .55992 | .67578 | 1.4798 | .82855 | 57 |
| 4 | .56016 | .67620 | 1.4788 | .82839 | 56 |
| 5 | .56040 | .67663 | 1.4779 | .82822 | 55 |
| 6 | .56064 | .67705 | 1.4770 | .82806 | 54 |
| 7 | .56088 | .67748 | 1.4761 | .82790 | 53 |
| 8 | .56112 | .67790 | 1.4751 | .82773 | 52 |
| 9 | .56136 | .67832 | 1.4742 | .82757 | 51 |
| 10 | .56160 | .67875 | 1.4733 | .82741 | 50 |
| 11 | .56184 | .67917 | 1.4724 | .82724 | 49 |
| 12 | .56208 | .67960 | 1.4715 | .82708 | 48 |
| 13 | .56232 | .68002 | 1.4705 | .82692 | 47 |
| 14 | .56256 | .68045 | 1.4696 | .82675 | 46 |
| 15 | .56280 | .68088 | 1.4687 | .82659 | 45 |
| 16 | .56305 | .68130 | 1.4678 | .82643 | 44 |
| 17 | .56329 | .68173 | 1.4669 | .82626 | 43 |
| 18 | .56353 | .68215 | 1.4659 | .82610 | 42 |
| 19 | .56377 | .68258 | 1.4650 | .82593 | 41 |
| 20 | .56401 | .68301 | 1.4641 | .82577 | 40 |
| 21 | .56425 | .68343 | 1.4632 | .82561 | 39 |
| 22 | .56449 | .68386 | 1.4623 | .82544 | 38 |
| 23 | .56473 | .68429 | 1.4614 | .82528 | 37 |
| 24 | .56497 | .68471 | 1.4605 | .82511 | 36 |
| 25 | .56521 | .68514 | 1.4596 | .82495 | 35 |
| 26 | .56545 | .68557 | 1.4586 | .82478 | 34 |
| 27 | .56569 | .68600 | 1.4577 | .82462 | 33 |
| 28 | .56593 | .68642 | 1.4568 | .82446 | 32 |
| 29 | .56617 | .68685 | 1.4559 | .82429 | 31 |
| 30 | .56641 | .68728 | 1.4550 | .82413 | 30 |
| 31 | .56665 | .68771 | 1.4541 | .82396 | 29 |
| 32 | .56689 | .68814 | 1.4532 | .82380 | 28 |
| 33 | .56713 | .68857 | 1.4523 | .82363 | 27 |
| 34 | .56736 | .68900 | 1.4514 | .82347 | 26 |
| 35 | .56760 | .68942 | 1.4505 | .82330 | 25 |
| 36 | .56784 | .68985 | 1.4496 | .82314 | 24 |
| 37 | .56808 | .69028 | 1.4487 | .82297 | 23 |
| 38 | .56832 | .69071 | 1.4478 | .82281 | 22 |
| 39 | .56856 | .69114 | 1.4469 | .82264 | 21 |
| 40 | .56880 | .69157 | 1.4460 | .82248 | 20 |
| 41 | .56904 | .69200 | 1.4451 | .82231 | 19 |
| 42 | .56928 | .69243 | 1.4442 | .82214 | 18 |
| 43 | .56952 | .69286 | 1.4433 | .82198 | 17 |
| 44 | .56976 | .69329 | 1.4424 | .82181 | 16 |
| 45 | .57000 | .69372 | 1.4415 | .82165 | 15 |
| 46 | .57024 | .69416 | 1.4406 | .82148 | 14 |
| 47 | .57047 | .69459 | 1.4397 | .82132 | 13 |
| 48 | .57071 | .69502 | 1.4388 | .82115 | 12 |
| 49 | .57095 | .69545 | 1.4379 | .82098 | 11 |
| 50 | .57119 | .69588 | 1.4370 | .82082 | 10 |
| 51 | .57143 | .69631 | 1.4361 | .82065 | 9 |
| 52 | .57167 | .69675 | 1.4352 | .82048 | 8 |
| 53 | .57191 | .69718 | 1.4344 | .82032 | 7 |
| 54 | .57215 | .69761 | 1.4335 | .82015 | 6 |
| 55 | .57238 | .69804 | 1.4326 | .81999 | 5 |
| 56 | .57262 | .69847 | 1.4317 | .81982 | 4 |
| 57 | .57286 | .69891 | 1.4308 | .81965 | 3 |
| 58 | .57310 | .69934 | 1.4299 | .81949 | 2 |
| 59 | .57334 | .69977 | 1.4290 | .81932 | 1 |
| 60 | .57358 | .70021 | 1.4281 | .81915 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .57358 | .70021 | 1.4281 | .81915 | 60 |
| 1 | .57381 | .70064 | 1.4273 | .81899 | 59 |
| 2 | .57405 | .70107 | 1.4264 | .81882 | 58 |
| 3 | .57429 | .70151 | 1.4255 | .81865 | 57 |
| 4 | .57453 | .70194 | 1.4246 | .81848 | 56 |
| 5 | .57477 | .70238 | 1.4237 | .81832 | 55 |
| 6 | .57501 | .70281 | 1.4229 | .81815 | 54 |
| 7 | .57524 | .70325 | 1.4220 | .81798 | 53 |
| 8 | .57548 | .70368 | 1.4211 | .81782 | 52 |
| 9 | .57572 | .70412 | 1.4202 | .81765 | 51 |
| 10 | .57596 | .70455 | 1.4193 | .81748 | 50 |
| 11 | .57619 | .70499 | 1.4185 | .81731 | 49 |
| 12 | .57643 | .70542 | 1.4176 | .81714 | 48 |
| 13 | .57667 | .70586 | 1.4167 | .81698 | 47 |
| 14 | .57691 | .70629 | 1.4158 | .81681 | 46 |
| 15 | .57715 | .70673 | 1.4150 | .81664 | 45 |
| 16 | .57738 | .70717 | 1.4141 | .81647 | 44 |
| 17 | .57762 | .70760 | 1.4132 | .81631 | 43 |
| 18 | .57786 | .70804 | 1.4124 | .81614 | 42 |
| 19 | .57810 | .70848 | 1.4115 | .81597 | 41 |
| 20 | .57833 | .70891 | 1.4106 | .81580 | 40 |
| 21 | .57857 | .70935 | 1.4097 | .81563 | 39 |
| 22 | .57881 | .70979 | 1.4089 | .81546 | 38 |
| 23 | .57904 | .71023 | 1.4080 | .81530 | 37 |
| 24 | .57928 | .71066 | 1.4071 | .81513 | 36 |
| 25 | .57952 | .71110 | 1.4063 | .81496 | 35 |
| 26 | .57976 | .71154 | 1.4054 | .81479 | 34 |
| 27 | .57999 | .71198 | 1.4045 | .81462 | 33 |
| 28 | .58023 | .71242 | 1.4037 | .81445 | 32 |
| 29 | .58047 | .71285 | 1.4028 | .81428 | 31 |
| 30 | .58070 | .71329 | 1.4019 | .81412 | 30 |
| 31 | .58094 | .71373 | 1.4011 | .81395 | 29 |
| 32 | .58118 | .71417 | 1.4002 | .81378 | 28 |
| 33 | .58141 | .71461 | 1.3994 | .81361 | 27 |
| 34 | .58165 | .71505 | 1.3985 | .81344 | 26 |
| 35 | .58189 | .71549 | 1.3976 | .81327 | 25 |
| 36 | .58212 | .71593 | 1.3968 | .81310 | 24 |
| 37 | .58236 | .71637 | 1.3959 | .81293 | 23 |
| 38 | .58260 | .71681 | 1.3951 | .81276 | 22 |
| 39 | .58283 | .71725 | 1.3942 | .81259 | 21 |
| 40 | .58307 | .71769 | 1.3934 | .81242 | 20 |
| 41 | .58330 | .71813 | 1.3925 | .81225 | 19 |
| 42 | .58354 | .71857 | 1.3916 | .81208 | 18 |
| 43 | .58378 | .71901 | 1.3908 | .81191 | 17 |
| 44 | .58401 | .71946 | 1.3899 | .81174 | 16 |
| 45 | .58425 | .71990 | 1.3891 | .81157 | 15 |
| 46 | .58449 | .72034 | 1.3882 | .81140 | 14 |
| 47 | .58472 | .72078 | 1.3874 | .81123 | 13 |
| 48 | .58496 | .72122 | 1.3865 | .81106 | 12 |
| 49 | .58519 | .72167 | 1.3857 | .81089 | 11 |
| 50 | .58543 | .72211 | 1.3848 | .81072 | 10 |
| 51 | .58567 | .72255 | 1.3840 | .81055 | 9 |
| 52 | .58590 | .72299 | 1.3831 | .81038 | 8 |
| 53 | .58614 | .72344 | 1.3823 | .81021 | 7 |
| 54 | .58637 | .72388 | 1.3814 | .81004 | 6 |
| 55 | .58661 | .72432 | 1.3806 | .80987 | 5 |
| 56 | .58684 | .72477 | 1.3798 | .80970 | 4 |
| 57 | .58708 | .72521 | 1.3789 | .80953 | 3 |
| 58 | .58731 | .72565 | 1.3781 | .80936 | 2 |
| 59 | .58755 | .72610 | 1.3772 | .80919 | 1 |
| 60 | .58779 | .72654 | 1.3764 | .80902 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

124° (304°)

(235°) 55°

125° (305°)

(234°) 54°

NATURAL FUNCTIONS (Continued)

36° (216°)

(323°) 143°

37° (217°)

(322°) 142°

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .58779 | .72654 | 1.3764 | .80902 | 60 |
| 1 | .58802 | .72699 | 1.3755 | .80885 | 59 |
| 2 | .58826 | .72743 | 1.3747 | .80867 | 58 |
| 3 | .58849 | .72788 | 1.3739 | .80850 | 57 |
| 4 | .58873 | .72832 | 1.3730 | .80833 | 56 |
| 5 | .58896 | .72877 | 1.3722 | .80816 | 55 |
| 6 | .58920 | .72921 | 1.3713 | .80799 | 54 |
| 7 | .58943 | .72966 | 1.3705 | .80782 | 53 |
| 8 | .58967 | .73010 | 1.3697 | .80765 | 52 |
| 9 | .58990 | .73055 | 1.3688 | .80748 | 51 |
| 10 | .59014 | .73100 | 1.3680 | .80730 | 50 |
| 11 | .59037 | .73144 | 1.3672 | .80713 | 49 |
| 12 | .59061 | .73189 | 1.3663 | .80696 | 48 |
| 13 | .59084 | .73234 | 1.3655 | .80679 | 47 |
| 14 | .59108 | .73278 | 1.3647 | .80662 | 46 |
| 15 | .59131 | .73323 | 1.3638 | .80644 | 45 |
| 16 | .59154 | .73368 | 1.3630 | .80627 | 44 |
| 17 | .59178 | .73413 | 1.3622 | .80610 | 43 |
| 18 | .59201 | .73457 | 1.3613 | .80593 | 42 |
| 19 | .59225 | .73502 | 1.3605 | .80576 | 41 |
| 20 | .59248 | .73547 | 1.3597 | .80558 | 40 |
| 21 | .59272 | .73592 | 1.3588 | .80541 | 39 |
| 22 | .59295 | .73637 | 1.3580 | .80524 | 38 |
| 23 | .59318 | .73681 | 1.3572 | .80507 | 37 |
| 24 | .59342 | .73726 | 1.3564 | .80489 | 36 |
| 25 | .59365 | .73771 | 1.3555 | .80472 | 35 |
| 26 | .59389 | .73816 | 1.3547 | .80455 | 34 |
| 27 | .59412 | .73861 | 1.3539 | .80438 | 33 |
| 28 | .59436 | .73906 | 1.3531 | .80420 | 32 |
| 29 | .59459 | .73951 | 1.3522 | .80403 | 31 |
| 30 | .59482 | .73996 | 1.3514 | .80386 | 30 |
| 31 | .59506 | .74041 | 1.3506 | .80368 | 29 |
| 32 | .59529 | .74086 | 1.3498 | .80351 | 28 |
| 33 | .59552 | .74131 | 1.3490 | .80334 | 27 |
| 34 | .59576 | .74176 | 1.3481 | .80316 | 26 |
| 35 | .59599 | .74221 | 1.3473 | .80299 | 25 |
| 36 | .59622 | .74267 | 1.3465 | .80282 | 24 |
| 37 | .59646 | .74312 | 1.3457 | .80264 | 23 |
| 38 | .59669 | .74357 | 1.3449 | .80247 | 22 |
| 39 | .59693 | .74402 | 1.3440 | .80230 | 21 |
| 40 | .59716 | .74447 | 1.3432 | .80212 | 20 |
| 41 | .59739 | .74492 | 1.3424 | .80195 | 19 |
| 42 | .59763 | .74538 | 1.3416 | .80178 | 18 |
| 43 | .59786 | .74583 | 1.3408 | .80160 | 17 |
| 44 | .59809 | .74628 | 1.3400 | .80143 | 16 |
| 45 | .59832 | .74674 | 1.3392 | .80125 | 15 |
| 46 | .59856 | .74719 | 1.3384 | .80108 | 14 |
| 47 | .59879 | .74764 | 1.3375 | .80091 | 13 |
| 48 | .59902 | .74810 | 1.3367 | .80073 | 12 |
| 49 | .59926 | .74855 | 1.3359 | .80056 | 11 |
| 50 | .59949 | .74900 | 1.3351 | .80038 | 10 |
| 51 | .59972 | .74946 | 1.3343 | .80021 | 9 |
| 52 | .59995 | .74991 | 1.3335 | .80003 | 8 |
| 53 | .60019 | .75037 | 1.3327 | .79986 | 7 |
| 54 | .60042 | .75082 | 1.3319 | .79968 | 6 |
| 55 | .60065 | .75128 | 1.3311 | .79951 | 5 |
| 56 | .60089 | .75173 | 1.3303 | .79934 | 4 |
| 57 | .60112 | .75219 | 1.3295 | .79916 | 3 |
| 58 | .60135 | .75264 | 1.3287 | .79899 | 2 |
| 59 | .60158 | .75310 | 1.3278 | .79881 | 1 |
| 60 | .60182 | .75355 | 1.3270 | .79864 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .60182 | .75355 | 1.3270 | .79864 | 60 |
| 1 | .60205 | .75401 | 1.3262 | .79846 | 59 |
| 2 | .60228 | .75447 | 1.3254 | .79829 | 58 |
| 3 | .60251 | .75492 | 1.3246 | .79811 | 57 |
| 4 | .60274 | .75538 | 1.3238 | .79793 | 56 |
| 5 | .60298 | .75584 | 1.3230 | .79776 | 55 |
| 6 | .60321 | .75629 | 1.3222 | .79758 | 54 |
| 7 | .60344 | .75675 | 1.3214 | .79741 | 53 |
| 8 | .60367 | .75721 | 1.3206 | .79723 | 52 |
| 9 | .60390 | .75767 | 1.3198 | .79706 | 51 |
| 10 | .60414 | .75812 | 1.3190 | .79688 | 50 |
| 11 | .60437 | .75858 | 1.3182 | .79671 | 49 |
| 12 | .60460 | .75904 | 1.3175 | .79653 | 48 |
| 13 | .60483 | .75950 | 1.3167 | .79635 | 47 |
| 14 | .60506 | .75996 | 1.3159 | .79618 | 46 |
| 15 | .60529 | .76042 | 1.3151 | .79600 | 45 |
| 16 | .60553 | .76088 | 1.3143 | .79583 | 44 |
| 17 | .60576 | .76134 | 1.3135 | .79565 | 43 |
| 18 | .60599 | .76180 | 1.3127 | .79547 | 42 |
| 19 | .60622 | .76226 | 1.3119 | .79530 | 41 |
| 20 | .60645 | .76272 | 1.3111 | .79512 | 40 |
| 21 | .60668 | .76318 | 1.3103 | .79494 | 39 |
| 22 | .60691 | .76364 | 1.3095 | .79477 | 38 |
| 23 | .60714 | .76410 | 1.3087 | .79459 | 37 |
| 24 | .60738 | .76456 | 1.3079 | .79441 | 36 |
| 25 | .60761 | .76502 | 1.3072 | .79424 | 35 |
| 26 | .60784 | .76548 | 1.3064 | .79406 | 34 |
| 27 | .60807 | .76594 | 1.3056 | .79388 | 33 |
| 28 | .60830 | .76640 | 1.3048 | .79371 | 32 |
| 29 | .60853 | .76686 | 1.3040 | .79353 | 31 |
| 30 | .60876 | .76733 | 1.3032 | .79335 | 30 |
| 31 | .60899 | .76779 | 1.3024 | .79318 | 29 |
| 32 | .60922 | .76825 | 1.3017 | .79300 | 28 |
| 33 | .60945 | .76871 | 1.3009 | .79282 | 27 |
| 34 | .60968 | .76918 | 1.3001 | .79264 | 26 |
| 35 | .60991 | .76964 | 1.2993 | .79247 | 25 |
| 36 | .61015 | .77010 | 1.2985 | .79229 | 24 |
| 37 | .61038 | .77057 | 1.2977 | .79211 | 23 |
| 38 | .61061 | .77103 | 1.2970 | .79193 | 22 |
| 39 | .61084 | .77149 | 1.2962 | .79176 | 21 |
| 40 | .61107 | .77196 | 1.2954 | .79158 | 20 |
| 41 | .61130 | .77242 | 1.2946 | .79140 | 19 |
| 42 | .61153 | .77289 | 1.2938 | .79122 | 18 |
| 43 | .61176 | .77335 | 1.2931 | .79105 | 17 |
| 44 | .61199 | .77382 | 1.2923 | .79087 | 16 |
| 45 | .61222 | .77428 | 1.2915 | .79069 | 15 |
| 46 | .61245 | .77475 | 1.2907 | .79051 | 14 |
| 47 | .61268 | .77521 | 1.2900 | .79033 | 13 |
| 48 | .61291 | .77568 | 1.2892 | .79016 | 12 |
| 49 | .61314 | .77615 | 1.2884 | .78998 | 11 |
| 50 | .61337 | .77661 | 1.2876 | .78980 | 10 |
| 51 | .61360 | .77708 | 1.2869 | .78962 | 9 |
| 52 | .61383 | .77754 | 1.2861 | .78944 | 8 |
| 53 | .61406 | .77801 | 1.2853 | .78926 | 7 |
| 54 | .61429 | .77848 | 1.2846 | .78908 | 6 |
| 55 | .61451 | .77895 | 1.2838 | .78891 | 5 |
| 56 | .61474 | .77941 | 1.2830 | .78873 | 4 |
| 57 | .61497 | .77988 | 1.2822 | .78855 | 3 |
| 58 | .61520 | .78035 | 1.2815 | .78837 | 2 |
| 59 | .61543 | .78082 | 1.2807 | .78819 | 1 |
| 60 | .61566 | .78129 | 1.2799 | .78801 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

126° (306°)

(233°) 53°

127° (307°)

(232°) 52°

NATURAL FUNCTIONS (Continued)

38° (218°)

(321°) 141°

39° (219°)

(320°) 140°

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .61566 | .78129 | 1.2799 | .78801 | 60 |
| 1 | .61589 | .78175 | 1.2792 | .78783 | 59 |
| 2 | .61612 | .78222 | 1.2784 | .78765 | 58 |
| 3 | .61635 | .78269 | 1.2776 | .78747 | 57 |
| 4 | .61658 | .78316 | 1.2769 | .78729 | 56 |
| 5 | .61681 | .78363 | 1.2761 | .78711 | 55 |
| 6 | .61704 | .78410 | 1.2753 | .78694 | 54 |
| 7 | .61726 | .78457 | 1.2746 | .78676 | 53 |
| 8 | .61749 | .78504 | 1.2738 | .78658 | 52 |
| 9 | .61772 | .78551 | 1.2731 | .78640 | 51 |
| 10 | .61795 | .78598 | 1.2723 | .78622 | 50 |
| 11 | .61818 | .78645 | 1.2715 | .78604 | 49 |
| 12 | .61841 | .78692 | 1.2708 | .78586 | 48 |
| 13 | .61864 | .78739 | 1.2700 | .78568 | 47 |
| 14 | .61887 | .78786 | 1.2693 | .78550 | 46 |
| 15 | .61909 | .78834 | 1.2685 | .78532 | 45 |
| 16 | .61932 | .78881 | 1.2677 | .78514 | 44 |
| 17 | .61955 | .78928 | 1.2670 | .78496 | 43 |
| 18 | .61978 | .78975 | 1.2662 | .78478 | 42 |
| 19 | .62001 | .79022 | 1.2655 | .78460 | 41 |
| 20 | .62024 | .79070 | 1.2647 | .78442 | 40 |
| 21 | .62046 | .79117 | 1.2640 | .78424 | 39 |
| 22 | .62069 | .79164 | 1.2632 | .78405 | 38 |
| 23 | .62092 | .79212 | 1.2624 | .78387 | 37 |
| 24 | .62115 | .79259 | 1.2617 | .78369 | 36 |
| 25 | .62138 | .79306 | 1.2609 | .78351 | 35 |
| 26 | .62160 | .79354 | 1.2602 | .78333 | 34 |
| 27 | .62183 | .79401 | 1.2594 | .78315 | 33 |
| 28 | .62206 | .79449 | 1.2587 | .78297 | 32 |
| 29 | .62229 | .79496 | 1.2579 | .78279 | 31 |
| 30 | .62251 | .79544 | 1.2572 | .78261 | 30 |
| 31 | .62274 | .79591 | 1.2564 | .78243 | 29 |
| 32 | .62297 | .79639 | 1.2557 | .78225 | 28 |
| 33 | .62320 | .79686 | 1.2549 | .78206 | 27 |
| 34 | .62342 | .79734 | 1.2542 | .78188 | 26 |
| 35 | .62365 | .79781 | 1.2534 | .78170 | 25 |
| 36 | .62388 | .79829 | 1.2527 | .78152 | 24 |
| 37 | .62411 | .79877 | 1.2519 | .78134 | 23 |
| 38 | .62433 | .79924 | 1.2512 | .78116 | 22 |
| 39 | .62456 | .79972 | 1.2504 | .78098 | 21 |
| 40 | .62479 | .80020 | 1.2497 | .78079 | 20 |
| 41 | .62502 | .80067 | 1.2489 | .78061 | 19 |
| 42 | .62524 | .80115 | 1.2482 | .78043 | 18 |
| 43 | .62547 | .80163 | 1.2475 | .78025 | 17 |
| 44 | .62570 | .80211 | 1.2467 | .78007 | 16 |
| 45 | .62592 | .80258 | 1.2460 | .77988 | 15 |
| 46 | .62615 | .80306 | 1.2452 | .77970 | 14 |
| 47 | .62638 | .80354 | 1.2445 | .77952 | 13 |
| 48 | .62660 | .80402 | 1.2437 | .77934 | 12 |
| 49 | .62683 | .80450 | 1.2430 | .77916 | 11 |
| 50 | .62706 | .80498 | 1.2423 | .77897 | 10 |
| 51 | .62728 | .80546 | 1.2415 | .77879 | 9 |
| 52 | .62751 | .80594 | 1.2408 | .77861 | 8 |
| 53 | .62774 | .80642 | 1.2401 | .77843 | 7 |
| 54 | .62796 | .80690 | 1.2393 | .77824 | 6 |
| 55 | .62819 | .80738 | 1.2386 | .77806 | 5 |
| 56 | .62842 | .80786 | 1.2378 | .77788 | 4 |
| 57 | .62864 | .80834 | 1.2371 | .77769 | 3 |
| 58 | .62887 | .80882 | 1.2364 | .77751 | 2 |
| 59 | .62909 | .80930 | 1.2356 | .77733 | 1 |
| 60 | .62932 | .80978 | 1.2349 | .77715 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .62932 | .80978 | 1.2349 | .77715 | 60 |
| 1 | .62955 | .81027 | 1.2342 | .77696 | 59 |
| 2 | .62977 | .81075 | 1.2334 | .77678 | 58 |
| 3 | .63000 | .81123 | 1.2327 | .77660 | 57 |
| 4 | .63022 | .81171 | 1.2320 | .77641 | 56 |
| 5 | .63045 | .81220 | 1.2312 | .77623 | 55 |
| 6 | .63068 | .81268 | 1.2305 | .77605 | 54 |
| 7 | .63090 | .81316 | 1.2298 | .77586 | 53 |
| 8 | .63113 | .81364 | 1.2290 | .77568 | 52 |
| 9 | .63135 | .81413 | 1.2283 | .77550 | 51 |
| 10 | .63158 | .81461 | 1.2276 | .77531 | 50 |
| 11 | .63180 | .81510 | 1.2268 | .77513 | 49 |
| 12 | .63203 | .81558 | 1.2261 | .77494 | 48 |
| 13 | .63225 | .81606 | 1.2254 | .77476 | 47 |
| 14 | .63248 | .81655 | 1.2247 | .77458 | 46 |
| 15 | .63271 | .81703 | 1.2239 | .77439 | 45 |
| 16 | .63293 | .81752 | 1.2232 | .77421 | 44 |
| 17 | .63316 | .81800 | 1.2225 | .77402 | 43 |
| 18 | .63338 | .81849 | 1.2218 | .77384 | 42 |
| 19 | .63361 | .81898 | 1.2210 | .77366 | 41 |
| 20 | .63383 | .81946 | 1.2203 | .77347 | 40 |
| 21 | .63406 | .81995 | 1.2196 | .77329 | 39 |
| 22 | .63428 | .82044 | 1.2189 | .77310 | 38 |
| 23 | .63451 | .82092 | 1.2181 | .77292 | 37 |
| 24 | .63473 | .82141 | 1.2174 | .77273 | 36 |
| 25 | .63496 | .82190 | 1.2167 | .77255 | 35 |
| 26 | .63518 | .82238 | 1.2160 | .77236 | 34 |
| 27 | .63540 | .82287 | 1.2153 | .77218 | 33 |
| 28 | .63563 | .82336 | 1.2145 | .77199 | 32 |
| 29 | .63585 | .82385 | 1.2138 | .77181 | 31 |
| 30 | .63608 | .82434 | 1.2131 | .77162 | 30 |
| 31 | .63630 | .82483 | 1.2124 | .77144 | 29 |
| 32 | .63653 | .82531 | 1.2117 | .77125 | 28 |
| 33 | .63675 | .82580 | 1.2109 | .77107 | 27 |
| 34 | .63698 | .82629 | 1.2102 | .77088 | 26 |
| 35 | .63720 | .82678 | 1.2095 | .77070 | 25 |
| 36 | .63742 | .82727 | 1.2088 | .77051 | 24 |
| 37 | .63765 | .82776 | 1.2081 | .77033 | 23 |
| 38 | .63787 | .82825 | 1.2074 | .77014 | 22 |
| 39 | .63810 | .82874 | 1.2066 | .76996 | 21 |
| 40 | .63832 | .82923 | 1.2059 | .76977 | 20 |
| 41 | .63854 | .82972 | 1.2052 | .76959 | 19 |
| 42 | .63877 | .83022 | 1.2045 | .76940 | 18 |
| 43 | .63899 | .83071 | 1.2038 | .76921 | 17 |
| 44 | .63922 | .83120 | 1.2031 | .76903 | 16 |
| 45 | .63944 | .83169 | 1.2024 | .76884 | 15 |
| 46 | .63966 | .83218 | 1.2017 | .76866 | 14 |
| 47 | .63989 | .83268 | 1.2009 | .76847 | 13 |
| 48 | .64011 | .83317 | 1.2002 | .76828 | 12 |
| 49 | .64033 | .83366 | 1.1995 | .76810 | 11 |
| 50 | .64056 | .83415 | 1.1988 | .76791 | 10 |
| 51 | .64078 | .83465 | 1.1981 | .76772 | 9 |
| 52 | .64100 | .83514 | 1.1974 | .76754 | 8 |
| 53 | .64123 | .83564 | 1.1967 | .76735 | 7 |
| 54 | .64145 | .83613 | 1.1960 | .76717 | 6 |
| 55 | .64167 | .83662 | 1.1953 | .76698 | 5 |
| 56 | .64190 | .83712 | 1.1946 | .76679 | 4 |
| 57 | .64212 | .83761 | 1.1939 | .76661 | 3 |
| 58 | .64234 | .83811 | 1.1932 | .76642 | 2 |
| 59 | .64256 | .83860 | 1.1925 | .76623 | 1 |
| 60 | .64279 | .83910 | 1.1918 | .76604 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

128° (308°)

(231°) 51°

129° (309°)

(230°) 50°

NATURAL FUNCTIONS (Continued)

40° (220°)

(319°) 139°

41° (221°)

(318°) 138°

| | Sin | Tan | Cot | Cos | |
|----|--------|--------|--------|--------|----|
| 0 | .64279 | .83910 | 1.1918 | .76604 | 60 |
| 1 | .64301 | .83960 | 1.1910 | .76586 | 59 |
| 2 | .64323 | .84009 | 1.1903 | .76567 | 58 |
| 3 | .64346 | .84059 | 1.1896 | .76548 | 57 |
| 4 | .64368 | .84108 | 1.1889 | .76530 | 56 |
| 5 | .64390 | .84158 | 1.1882 | .76511 | 55 |
| 6 | .64412 | .84208 | 1.1875 | .76492 | 54 |
| 7 | .64435 | .84258 | 1.1868 | .76473 | 53 |
| 8 | .64457 | .84307 | 1.1861 | .76455 | 52 |
| 9 | .64479 | .84357 | 1.1854 | .76436 | 51 |
| 10 | .64501 | .84407 | 1.1847 | .76417 | 50 |
| 11 | .64524 | .84457 | 1.1840 | .76398 | 49 |
| 12 | .64546 | .84507 | 1.1833 | .76380 | 48 |
| 13 | .64568 | .84556 | 1.1826 | .76361 | 47 |
| 14 | .64590 | .84606 | 1.1819 | .76342 | 46 |
| 15 | .64612 | .84656 | 1.1812 | .76323 | 45 |
| 16 | .64635 | .84706 | 1.1806 | .76304 | 44 |
| 17 | .64657 | .84756 | 1.1799 | .76286 | 43 |
| 18 | .64679 | .84806 | 1.1792 | .76267 | 42 |
| 19 | .64701 | .84856 | 1.1785 | .76248 | 41 |
| 20 | .64723 | .84906 | 1.1778 | .76229 | 40 |
| 21 | .64746 | .84956 | 1.1771 | .76210 | 39 |
| 22 | .64768 | .85006 | 1.1764 | .76192 | 38 |
| 23 | .64790 | .85057 | 1.1757 | .76173 | 37 |
| 24 | .64812 | .85107 | 1.1750 | .76154 | 36 |
| 25 | .64834 | .85157 | 1.1743 | .76135 | 35 |
| 26 | .64856 | .85207 | 1.1736 | .76116 | 34 |
| 27 | .64878 | .85257 | 1.1729 | .76097 | 33 |
| 28 | .64901 | .85308 | 1.1722 | .76078 | 32 |
| 29 | .64923 | .85358 | 1.1715 | .76059 | 31 |
| 30 | .64945 | .85408 | 1.1708 | .76041 | 30 |
| 31 | .64967 | .85458 | 1.1702 | .76022 | 29 |
| 32 | .64989 | .85509 | 1.1695 | .76003 | 28 |
| 33 | .65011 | .85559 | 1.1688 | .75984 | 27 |
| 34 | .65033 | .85609 | 1.1681 | .75965 | 26 |
| 35 | .65055 | .85660 | 1.1674 | .75946 | 25 |
| 36 | .65077 | .85710 | 1.1667 | .75927 | 24 |
| 37 | .65100 | .85761 | 1.1660 | .75908 | 23 |
| 38 | .65122 | .85811 | 1.1653 | .75889 | 22 |
| 39 | .65144 | .85862 | 1.1647 | .75870 | 21 |
| 40 | .65166 | .85912 | 1.1640 | .75851 | 20 |
| 41 | .65188 | .85963 | 1.1633 | .75832 | 19 |
| 42 | .65210 | .86014 | 1.1626 | .75813 | 18 |
| 43 | .65232 | .86064 | 1.1619 | .75794 | 17 |
| 44 | .65254 | .86115 | 1.1612 | .75775 | 16 |
| 45 | .65276 | .86166 | 1.1606 | .75756 | 15 |
| 46 | .65298 | .86216 | 1.1599 | .75738 | 14 |
| 47 | .65320 | .86267 | 1.1592 | .75719 | 13 |
| 48 | .65342 | .86318 | 1.1585 | .75700 | 12 |
| 49 | .65364 | .86368 | 1.1578 | .75680 | 11 |
| 50 | .65386 | .86419 | 1.1571 | .75661 | 10 |
| 51 | .65408 | .86470 | 1.1565 | .75642 | 9 |
| 52 | .65430 | .86521 | 1.1558 | .75623 | 8 |
| 53 | .65452 | .86572 | 1.1551 | .75604 | 7 |
| 54 | .65474 | .86623 | 1.1544 | .75585 | 6 |
| 55 | .65496 | .86674 | 1.1538 | .75566 | 5 |
| 56 | .65518 | .86725 | 1.1531 | .75547 | 4 |
| 57 | .65540 | .86776 | 1.1524 | .75528 | 3 |
| 58 | .65562 | .86827 | 1.1517 | .75509 | 2 |
| 59 | .65584 | .86878 | 1.1510 | .75490 | 1 |
| 60 | .65606 | .86929 | 1.1504 | .75471 | 0 |
| | Cos | Cot | Tan | Sin | |

130° (310°)

(229°) 49°

131° (311°)

(228°) 48°

| | Sin | Tan | Cot | Cos | |
|----|--------|--------|--------|--------|----|
| 0 | .65606 | .86929 | 1.1504 | .75471 | 60 |
| 1 | .65628 | .86980 | 1.1497 | .75452 | 59 |
| 2 | .65650 | .87031 | 1.1490 | .75433 | 58 |
| 3 | .65672 | .87082 | 1.1483 | .75414 | 57 |
| 4 | .65694 | .87133 | 1.1477 | .75395 | 56 |
| 5 | .65716 | .87184 | 1.1470 | .75375 | 55 |
| 6 | .65738 | .87236 | 1.1463 | .75356 | 54 |
| 7 | .65759 | .87287 | 1.1456 | .75337 | 53 |
| 8 | .65781 | .87338 | 1.1450 | .75318 | 52 |
| 9 | .65803 | .87389 | 1.1443 | .75299 | 51 |
| 10 | .65825 | .87441 | 1.1436 | .75280 | 50 |
| 11 | .65847 | .87492 | 1.1430 | .75261 | 49 |
| 12 | .65869 | .87543 | 1.1423 | .75241 | 48 |
| 13 | .65891 | .87595 | 1.1416 | .75222 | 47 |
| 14 | .65913 | .87646 | 1.1410 | .75203 | 46 |
| 15 | .65935 | .87698 | 1.1403 | .75184 | 45 |
| 16 | .65956 | .87749 | 1.1396 | .75165 | 44 |
| 17 | .65978 | .87801 | 1.1389 | .75146 | 43 |
| 18 | .66000 | .87852 | 1.1383 | .75126 | 42 |
| 19 | .66022 | .87904 | 1.1376 | .75107 | 41 |
| 20 | .66044 | .87955 | 1.1369 | .75088 | 40 |
| 21 | .66066 | .88007 | 1.1363 | .75069 | 39 |
| 22 | .66088 | .88059 | 1.1356 | .75050 | 38 |
| 23 | .66109 | .88110 | 1.1349 | .75030 | 37 |
| 24 | .66131 | .88162 | 1.1343 | .75011 | 36 |
| 25 | .66153 | .88214 | 1.1336 | .74992 | 35 |
| 26 | .66175 | .88265 | 1.1329 | .74973 | 34 |
| 27 | .66197 | .88317 | 1.1323 | .74953 | 33 |
| 28 | .66218 | .88369 | 1.1316 | .74934 | 32 |
| 29 | .66240 | .88421 | 1.1310 | .74915 | 31 |
| 30 | .66262 | .88473 | 1.1303 | .74896 | 30 |
| 31 | .66284 | .88524 | 1.1296 | .74876 | 29 |
| 32 | .66306 | .88576 | 1.1290 | .74857 | 28 |
| 33 | .66327 | .88628 | 1.1283 | .74838 | 27 |
| 34 | .66349 | .88680 | 1.1276 | .74818 | 26 |
| 35 | .66371 | .88732 | 1.1270 | .74799 | 25 |
| 36 | .66393 | .88784 | 1.1263 | .74780 | 24 |
| 37 | .66414 | .88836 | 1.1257 | .74760 | 23 |
| 38 | .66436 | .88888 | 1.1250 | .74741 | 22 |
| 39 | .66458 | .88940 | 1.1243 | .74722 | 21 |
| 40 | .66480 | .88992 | 1.1237 | .74703 | 20 |
| 41 | .66501 | .89045 | 1.1230 | .74683 | 19 |
| 42 | .66523 | .89097 | 1.1224 | .74664 | 18 |
| 43 | .66545 | .89149 | 1.1217 | .74644 | 17 |
| 44 | .66566 | .89201 | 1.1211 | .74625 | 16 |
| 45 | .66588 | .89253 | 1.1204 | .74606 | 15 |
| 46 | .66610 | .89306 | 1.1197 | .74586 | 14 |
| 47 | .66632 | .89358 | 1.1191 | .74567 | 13 |
| 48 | .66653 | .89410 | 1.1184 | .74548 | 12 |
| 49 | .66675 | .89463 | 1.1178 | .74528 | 11 |
| 50 | .66697 | .89515 | 1.1171 | .74509 | 10 |
| 51 | .66718 | .89567 | 1.1165 | .74489 | 9 |
| 52 | .66740 | .89620 | 1.1158 | .74470 | 8 |
| 53 | .66762 | .89672 | 1.1152 | .74451 | 7 |
| 54 | .66783 | .89725 | 1.1145 | .74431 | 6 |
| 55 | .66805 | .89777 | 1.1139 | .74412 | 5 |
| 56 | .66827 | .89830 | 1.1132 | .74392 | 4 |
| 57 | .66848 | .89883 | 1.1126 | .74373 | 3 |
| 58 | .66870 | .89935 | 1.1119 | .74353 | 2 |
| 59 | .66891 | .89988 | 1.1113 | .74334 | 1 |
| 60 | .66913 | .90040 | 1.1106 | .74314 | 0 |
| | Cos | Cot | Tan | Sin | |

NATURAL FUNCTIONS (Continued)

42° (222°)

(317°) 137°

43° (223°)

(316°) 136°

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .66913 | .90040 | 1.1106 | .74314 | 60 |
| 1 | .66935 | .90093 | 1.1100 | .74295 | 59 |
| 2 | .66956 | .90146 | 1.1093 | .74276 | 58 |
| 3 | .66978 | .90199 | 1.1087 | .74256 | 57 |
| 4 | .66999 | .90251 | 1.1080 | .74237 | 56 |
| 5 | .67021 | .90304 | 1.1074 | .74217 | 55 |
| 6 | .67043 | .90357 | 1.1067 | .74198 | 54 |
| 7 | .67064 | .90410 | 1.1061 | .74178 | 53 |
| 8 | .67086 | .90463 | 1.1054 | .74159 | 52 |
| 9 | .67107 | .90516 | 1.1048 | .74139 | 51 |
| 10 | .67129 | .90569 | 1.1041 | .74120 | 50 |
| 11 | .67151 | .90621 | 1.1035 | .74100 | 49 |
| 12 | .67172 | .90674 | 1.1028 | .74080 | 48 |
| 13 | .67194 | .90727 | 1.1022 | .74061 | 47 |
| 14 | .67215 | .90781 | 1.1016 | .74041 | 46 |
| 15 | .67237 | .90834 | 1.1009 | .74022 | 45 |
| 16 | .67258 | .90887 | 1.1003 | .74002 | 44 |
| 17 | .67280 | .90940 | 1.0996 | .73983 | 43 |
| 18 | .67301 | .90993 | 1.0990 | .73963 | 42 |
| 19 | .67323 | .91046 | 1.0983 | .73944 | 41 |
| 20 | .67344 | .91099 | 1.0977 | .73924 | 40 |
| 21 | .67366 | .91153 | 1.0971 | .73904 | 39 |
| 22 | .67387 | .91206 | 1.0964 | .73885 | 38 |
| 23 | .67409 | .91259 | 1.0958 | .73865 | 37 |
| 24 | .67430 | .91313 | 1.0951 | .73846 | 36 |
| 25 | .67452 | .91366 | 1.0945 | .73826 | 35 |
| 26 | .67473 | .91419 | 1.0939 | .73806 | 34 |
| 27 | .67495 | .91473 | 1.0932 | .73787 | 33 |
| 28 | .67516 | .91526 | 1.0926 | .73767 | 32 |
| 29 | .67538 | .91580 | 1.0919 | .73747 | 31 |
| 30 | .67559 | .91633 | 1.0913 | .73728 | 30 |
| 31 | .67580 | .91687 | 1.0907 | .73708 | 29 |
| 32 | .67602 | .91740 | 1.0900 | .73688 | 28 |
| 33 | .67623 | .91794 | 1.0894 | .73669 | 27 |
| 34 | .67645 | .91847 | 1.0888 | .73649 | 26 |
| 35 | .67666 | .91901 | 1.0881 | .73629 | 25 |
| 36 | .67688 | .91955 | 1.0875 | .73610 | 24 |
| 37 | .67709 | .92008 | 1.0869 | .73590 | 23 |
| 38 | .67730 | .92062 | 1.0862 | .73570 | 22 |
| 39 | .67752 | .92116 | 1.0856 | .73551 | 21 |
| 40 | .67773 | .92170 | 1.0850 | .73531 | 20 |
| 41 | .67795 | .92224 | 1.0843 | .73511 | 19 |
| 42 | .67816 | .92277 | 1.0837 | .73491 | 18 |
| 43 | .67837 | .92331 | 1.0831 | .73472 | 17 |
| 44 | .67859 | .92385 | 1.0824 | .73452 | 16 |
| 45 | .67880 | .92439 | 1.0818 | .73432 | 15 |
| 46 | .67901 | .92493 | 1.0812 | .73413 | 14 |
| 47 | .67923 | .92547 | 1.0805 | .73393 | 13 |
| 48 | .67944 | .92601 | 1.0799 | .73373 | 12 |
| 49 | .67965 | .92655 | 1.0793 | .73353 | 11 |
| 50 | .67987 | .92709 | 1.0786 | .73333 | 10 |
| 51 | .68008 | .92763 | 1.0780 | .73314 | 9 |
| 52 | .68029 | .92817 | 1.0774 | .73294 | 8 |
| 53 | .68051 | .92872 | 1.0768 | .73274 | 7 |
| 54 | .68072 | .92926 | 1.0761 | .73254 | 6 |
| 55 | .68093 | .92980 | 1.0755 | .73234 | 5 |
| 56 | .68115 | .93034 | 1.0749 | .73215 | 4 |
| 57 | .68136 | .93088 | 1.0742 | .73195 | 3 |
| 58 | .68157 | .93143 | 1.0736 | .73175 | 2 |
| 59 | .68179 | .93197 | 1.0730 | .73155 | 1 |
| 60 | .68200 | .93252 | 1.0724 | .73135 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

| ' | Sin | Tan | Cot | Cos | ' |
|----|--------|--------|--------|--------|----|
| 0 | .68200 | .93252 | 1.0724 | .73135 | 60 |
| 1 | .68221 | .93306 | 1.0717 | .73116 | 59 |
| 2 | .68242 | .93360 | 1.0711 | .73096 | 58 |
| 3 | .68264 | .93415 | 1.0705 | .73076 | 57 |
| 4 | .68285 | .93469 | 1.0699 | .73056 | 56 |
| 5 | .68306 | .93524 | 1.0692 | .73036 | 55 |
| 6 | .68327 | .93578 | 1.0686 | .73016 | 54 |
| 7 | .68349 | .93633 | 1.0680 | .72996 | 53 |
| 8 | .68370 | .93688 | 1.0674 | .72976 | 52 |
| 9 | .68391 | .93742 | 1.0668 | .72957 | 51 |
| 10 | .68412 | .93797 | 1.0661 | .72937 | 50 |
| 11 | .68434 | .93852 | 1.0655 | .72917 | 49 |
| 12 | .68455 | .93906 | 1.0649 | .72897 | 48 |
| 13 | .68476 | .93961 | 1.0643 | .72877 | 47 |
| 14 | .68497 | .94016 | 1.0637 | .72857 | 46 |
| 15 | .68518 | .94071 | 1.0630 | .72837 | 45 |
| 16 | .68539 | .94125 | 1.0624 | .72817 | 44 |
| 17 | .68561 | .94180 | 1.0618 | .72797 | 43 |
| 18 | .68582 | .94235 | 1.0612 | .72777 | 42 |
| 19 | .68603 | .94290 | 1.0606 | .72757 | 41 |
| 20 | .68624 | .94345 | 1.0599 | .72737 | 40 |
| 21 | .68645 | .94400 | 1.0593 | .72717 | 39 |
| 22 | .68666 | .94455 | 1.0587 | .72697 | 38 |
| 23 | .68688 | .94510 | 1.0581 | .72677 | 37 |
| 24 | .68709 | .94565 | 1.0575 | .72657 | 36 |
| 25 | .68730 | .94620 | 1.0569 | .72637 | 35 |
| 26 | .68751 | .94676 | 1.0562 | .72617 | 34 |
| 27 | .68772 | .94731 | 1.0556 | .72597 | 33 |
| 28 | .68793 | .94786 | 1.0550 | .72577 | 32 |
| 29 | .68814 | .94841 | 1.0544 | .72557 | 31 |
| 30 | .68835 | .94896 | 1.0538 | .72537 | 30 |
| 31 | .68857 | .94952 | 1.0532 | .72517 | 29 |
| 32 | .68878 | .95007 | 1.0526 | .72497 | 28 |
| 33 | .68899 | .95062 | 1.0519 | .72477 | 27 |
| 34 | .68920 | .95118 | 1.0513 | .72457 | 26 |
| 35 | .68941 | .95173 | 1.0507 | .72437 | 25 |
| 36 | .68962 | .95229 | 1.0501 | .72417 | 24 |
| 37 | .68983 | .95284 | 1.0495 | .72397 | 23 |
| 38 | .69004 | .95340 | 1.0489 | .72377 | 22 |
| 39 | .69025 | .95395 | 1.0483 | .72357 | 21 |
| 40 | .69046 | .95451 | 1.0477 | .72337 | 20 |
| 41 | .69067 | .95506 | 1.0470 | .72317 | 19 |
| 42 | .69088 | .95562 | 1.0464 | .72297 | 18 |
| 43 | .69109 | .95618 | 1.0458 | .72277 | 17 |
| 44 | .69130 | .95673 | 1.0452 | .72257 | 16 |
| 45 | .69151 | .95729 | 1.0446 | .72236 | 15 |
| 46 | .69172 | .95785 | 1.0440 | .72216 | 14 |
| 47 | .69193 | .95841 | 1.0434 | .72196 | 13 |
| 48 | .69214 | .95897 | 1.0428 | .72176 | 12 |
| 49 | .69235 | .95952 | 1.0422 | .72156 | 11 |
| 50 | .69256 | .96008 | 1.0416 | .72136 | 10 |
| 51 | .69277 | .96064 | 1.0410 | .72116 | 9 |
| 52 | .69298 | .96120 | 1.0404 | .72095 | 8 |
| 53 | .69319 | .96176 | 1.0398 | .72075 | 7 |
| 54 | .69340 | .96232 | 1.0392 | .72055 | 6 |
| 55 | .69361 | .96288 | 1.0385 | .72035 | 5 |
| 56 | .69382 | .96344 | 1.0379 | .72015 | 4 |
| 57 | .69403 | .96400 | 1.0373 | .71995 | 3 |
| 58 | .69424 | .96457 | 1.0367 | .71974 | 2 |
| 59 | .69445 | .96513 | 1.0361 | .71954 | 1 |
| 60 | .69466 | .96569 | 1.0355 | .71934 | 0 |
| ' | Cos | Cot | Tan | Sin | ' |

132° (312°)

(227°) 47°

133° (313°)

(226°) 46°

NATURAL FUNCTIONS (Continued)

44° (224°)

(315°) 135°

| | Sin | Tan | Cot | Cos | |
|----|--------|--------|--------|--------|----|
| 0 | .69466 | .96569 | 1.0355 | .71934 | 60 |
| 1 | .69487 | .96625 | 1.0349 | .71914 | 59 |
| 2 | .69508 | .96681 | 1.0343 | .71894 | 58 |
| 3 | .69529 | .96738 | 1.0337 | .71873 | 57 |
| 4 | .69549 | .96794 | 1.0331 | .71853 | 56 |
| 5 | .69570 | .96850 | 1.0325 | .71833 | 55 |
| 6 | .69591 | .96907 | 1.0319 | .71813 | 54 |
| 7 | .69612 | .96963 | 1.0313 | .71792 | 53 |
| 8 | .69633 | .97020 | 1.0307 | .71772 | 52 |
| 9 | .69654 | .97076 | 1.0301 | .71752 | 51 |
| 10 | .69675 | .97133 | 1.0295 | .71732 | 50 |
| 11 | .69696 | .97189 | 1.0289 | .71711 | 49 |
| 12 | .69717 | .97246 | 1.0283 | .71691 | 48 |
| 13 | .69737 | .97302 | 1.0277 | .71671 | 47 |
| 14 | .69758 | .97359 | 1.0271 | .71650 | 46 |
| 15 | .69779 | .97416 | 1.0265 | .71630 | 45 |
| 16 | .69800 | .97472 | 1.0259 | .71610 | 44 |
| 17 | .69821 | .97529 | 1.0253 | .71590 | 43 |
| 18 | .69842 | .97586 | 1.0247 | .71569 | 42 |
| 19 | .69862 | .97643 | 1.0241 | .71549 | 41 |
| 20 | .69883 | .97700 | 1.0235 | .71529 | 40 |
| 21 | .69904 | .97756 | 1.0230 | .71508 | 39 |
| 22 | .69925 | .97813 | 1.0224 | .71488 | 38 |
| 23 | .69946 | .97870 | 1.0218 | .71468 | 37 |
| 24 | .69966 | .97927 | 1.0212 | .71447 | 36 |
| 25 | .69987 | .97984 | 1.0206 | .71427 | 35 |
| 26 | .70008 | .98041 | 1.0200 | .71407 | 34 |
| 27 | .70029 | .98098 | 1.0194 | .71386 | 33 |
| 28 | .70049 | .98155 | 1.0188 | .71366 | 32 |
| 29 | .70070 | .98213 | 1.0182 | .71345 | 31 |
| 30 | .70091 | .98270 | 1.0176 | .71325 | 30 |
| 31 | .70112 | .98327 | 1.0170 | .71305 | 29 |
| 32 | .70132 | .98384 | 1.0164 | .71284 | 28 |
| 33 | .70153 | .98441 | 1.0158 | .71264 | 27 |
| 34 | .70174 | .98499 | 1.0152 | .71243 | 26 |
| 35 | .70195 | .98556 | 1.0147 | .71223 | 25 |
| 36 | .70215 | .98613 | 1.0141 | .71203 | 24 |
| 37 | .70236 | .98671 | 1.0135 | .71182 | 23 |
| 38 | .70257 | .98728 | 1.0129 | .71162 | 22 |
| 39 | .70277 | .98786 | 1.0123 | .71141 | 21 |
| 40 | .70298 | .98843 | 1.0117 | .71121 | 20 |
| 41 | .70319 | .98901 | 1.0111 | .71100 | 19 |
| 42 | .70339 | .98958 | 1.0105 | .71080 | 18 |
| 43 | .70360 | .99016 | 1.0099 | .71059 | 17 |
| 44 | .70381 | .99073 | 1.0094 | .71039 | 16 |
| 45 | .70401 | .99131 | 1.0088 | .71019 | 15 |
| 46 | .70422 | .99189 | 1.0082 | .70998 | 14 |
| 47 | .70443 | .99247 | 1.0076 | .70978 | 13 |
| 48 | .70463 | .99304 | 1.0070 | .70957 | 12 |
| 49 | .70484 | .99362 | 1.0064 | .70937 | 11 |
| 50 | .70505 | .99420 | 1.0058 | .70916 | 10 |
| 51 | .70525 | .99478 | 1.0052 | .70896 | 9 |
| 52 | .70546 | .99536 | 1.0047 | .70875 | 8 |
| 53 | .70567 | .99594 | 1.0041 | .70855 | 7 |
| 54 | .70587 | .99652 | 1.0035 | .70834 | 6 |
| 55 | .70608 | .99710 | 1.0029 | .70813 | 5 |
| 56 | .70628 | .99768 | 1.0023 | .70793 | 4 |
| 57 | .70649 | .99826 | 1.0017 | .70772 | 3 |
| 58 | .70670 | .99884 | 1.0012 | .70752 | 2 |
| 59 | .70690 | .99942 | 1.0006 | .70731 | 1 |
| 60 | .70711 | 1.0000 | 1.0000 | .70711 | 0 |
| | Cos | Cot | Tan | Sin | |

134° (314°)

(225°) 45°

NATURAL FUNCTIONS—SECANTS AND COSECANTS

0° (180°) (359°) 179° 1° (181°) (358°) 178° 2° (182°) (357°) 177°

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.0000 | | 60 |
| 1 | 1.0000 | 3437.7 | 59 |
| 2 | 1.0000 | 1718.9 | 58 |
| 3 | 1.0000 | 1145.9 | 57 |
| 4 | 1.0000 | 859.44 | 56 |
| 5 | 1.0000 | 687.55 | 55 |
| 6 | 1.0000 | 572.96 | 54 |
| 7 | 1.0000 | 491.11 | 53 |
| 8 | 1.0000 | 429.72 | 52 |
| 9 | 1.0000 | 381.97 | 51 |
| 10 | 1.0000 | 343.78 | 50 |
| 11 | 1.0000 | 312.52 | 49 |
| 12 | 1.0000 | 286.48 | 48 |
| 13 | 1.0000 | 264.44 | 47 |
| 14 | 1.0000 | 245.55 | 46 |
| 15 | 1.0000 | 229.18 | 45 |
| 16 | 1.0000 | 214.86 | 44 |
| 17 | 1.0000 | 202.22 | 43 |
| 18 | 1.0000 | 190.99 | 42 |
| 19 | 1.0000 | 180.93 | 41 |
| 20 | 1.0000 | 171.89 | 40 |
| 21 | 1.0000 | 163.70 | 39 |
| 22 | 1.0000 | 156.26 | 38 |
| 23 | 1.0000 | 149.47 | 37 |
| 24 | 1.0000 | 143.24 | 36 |
| 25 | 1.0000 | 137.51 | 35 |
| 26 | 1.0000 | 132.22 | 34 |
| 27 | 1.0000 | 127.33 | 33 |
| 28 | 1.0000 | 122.78 | 32 |
| 29 | 1.0000 | 118.54 | 31 |
| 30 | 1.0000 | 114.59 | 30 |
| 31 | 1.0000 | 110.90 | 29 |
| 32 | 1.0000 | 107.43 | 28 |
| 33 | 1.0000 | 104.18 | 27 |
| 34 | 1.0000 | 101.11 | 26 |
| 35 | 1.0001 | 98.223 | 25 |
| 36 | 1.0001 | 95.495 | 24 |
| 37 | 1.0001 | 92.914 | 23 |
| 38 | 1.0001 | 90.469 | 22 |
| 39 | 1.0001 | 88.149 | 21 |
| 40 | 1.0001 | 85.946 | 20 |
| 41 | 1.0001 | 83.849 | 19 |
| 42 | 1.0001 | 81.853 | 18 |
| 43 | 1.0001 | 79.950 | 17 |
| 44 | 1.0001 | 78.133 | 16 |
| 45 | 1.0001 | 76.397 | 15 |
| 46 | 1.0001 | 74.736 | 14 |
| 47 | 1.0001 | 73.146 | 13 |
| 48 | 1.0001 | 71.622 | 12 |
| 49 | 1.0001 | 70.160 | 11 |
| 50 | 1.0001 | 68.757 | 10 |
| 51 | 1.0001 | 67.409 | 9 |
| 52 | 1.0001 | 66.113 | 8 |
| 53 | 1.0001 | 64.866 | 7 |
| 54 | 1.0001 | 63.665 | 6 |
| 55 | 1.0001 | 62.507 | 5 |
| 56 | 1.0001 | 61.391 | 4 |
| 57 | 1.0001 | 60.314 | 3 |
| 58 | 1.0001 | 59.274 | 2 |
| 59 | 1.0001 | 58.270 | 1 |
| 60 | 1.0002 | 57.299 | 0 |
| ' | Csc | Sec | ' |

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.0002 | 57.299 | 60 |
| 1 | 1.0002 | 56.359 | 59 |
| 2 | 1.0002 | 55.451 | 58 |
| 3 | 1.0002 | 54.570 | 57 |
| 4 | 1.0002 | 53.718 | 56 |
| 5 | 1.0002 | 52.892 | 55 |
| 6 | 1.0002 | 52.090 | 54 |
| 7 | 1.0002 | 51.313 | 53 |
| 8 | 1.0002 | 50.558 | 52 |
| 9 | 1.0002 | 49.826 | 51 |
| 10 | 1.0002 | 49.114 | 50 |
| 11 | 1.0002 | 48.422 | 49 |
| 12 | 1.0002 | 47.750 | 48 |
| 13 | 1.0002 | 47.096 | 47 |
| 14 | 1.0002 | 46.460 | 46 |
| 15 | 1.0002 | 45.840 | 45 |
| 16 | 1.0002 | 45.237 | 44 |
| 17 | 1.0003 | 44.650 | 43 |
| 18 | 1.0003 | 44.077 | 42 |
| 19 | 1.0003 | 43.520 | 41 |
| 20 | 1.0003 | 42.976 | 40 |
| 21 | 1.0003 | 42.445 | 39 |
| 22 | 1.0003 | 41.928 | 38 |
| 23 | 1.0003 | 41.423 | 37 |
| 24 | 1.0003 | 40.930 | 36 |
| 25 | 1.0003 | 40.448 | 35 |
| 26 | 1.0003 | 39.978 | 34 |
| 27 | 1.0003 | 39.519 | 33 |
| 28 | 1.0003 | 39.070 | 32 |
| 29 | 1.0003 | 38.631 | 31 |
| 30 | 1.0003 | 38.202 | 30 |
| 31 | 1.0004 | 37.782 | 29 |
| 32 | 1.0004 | 37.371 | 28 |
| 33 | 1.0004 | 36.970 | 27 |
| 34 | 1.0004 | 36.576 | 26 |
| 35 | 1.0004 | 36.191 | 25 |
| 36 | 1.0004 | 35.815 | 24 |
| 37 | 1.0004 | 35.445 | 23 |
| 38 | 1.0004 | 35.081 | 22 |
| 39 | 1.0004 | 34.730 | 21 |
| 40 | 1.0004 | 34.382 | 20 |
| 41 | 1.0004 | 34.042 | 19 |
| 42 | 1.0004 | 33.708 | 18 |
| 43 | 1.0004 | 33.381 | 17 |
| 44 | 1.0005 | 33.060 | 16 |
| 45 | 1.0005 | 32.746 | 15 |
| 46 | 1.0005 | 32.437 | 14 |
| 47 | 1.0005 | 32.134 | 13 |
| 48 | 1.0005 | 31.836 | 12 |
| 49 | 1.0005 | 31.544 | 11 |
| 50 | 1.0005 | 31.258 | 10 |
| 51 | 1.0005 | 30.976 | 9 |
| 52 | 1.0005 | 30.700 | 8 |
| 53 | 1.0005 | 30.428 | 7 |
| 54 | 1.0006 | 30.161 | 6 |
| 55 | 1.0006 | 29.899 | 5 |
| 56 | 1.0006 | 29.641 | 4 |
| 57 | 1.0006 | 29.388 | 3 |
| 58 | 1.0006 | 29.139 | 2 |
| 59 | 1.0006 | 28.894 | 1 |
| 60 | 1.0006 | 28.654 | 0 |
| ' | Csc | Sec | ' |

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.0006 | 28.654 | 60 |
| 1 | 1.0006 | 28.417 | 59 |
| 2 | 1.0006 | 28.184 | 58 |
| 3 | 1.0006 | 27.955 | 57 |
| 4 | 1.0007 | 27.730 | 56 |
| 5 | 1.0007 | 27.508 | 55 |
| 6 | 1.0007 | 27.290 | 54 |
| 7 | 1.0007 | 27.075 | 53 |
| 8 | 1.0007 | 26.864 | 52 |
| 9 | 1.0007 | 26.655 | 51 |
| 10 | 1.0007 | 26.451 | 50 |
| 11 | 1.0007 | 26.249 | 49 |
| 12 | 1.0007 | 26.050 | 48 |
| 13 | 1.0007 | 25.854 | 47 |
| 14 | 1.0008 | 25.661 | 46 |
| 15 | 1.0008 | 25.471 | 45 |
| 16 | 1.0008 | 25.284 | 44 |
| 17 | 1.0008 | 25.100 | 43 |
| 18 | 1.0008 | 24.918 | 42 |
| 19 | 1.0008 | 24.739 | 41 |
| 20 | 1.0008 | 24.562 | 40 |
| 21 | 1.0008 | 24.388 | 39 |
| 22 | 1.0009 | 24.216 | 38 |
| 23 | 1.0009 | 24.047 | 37 |
| 24 | 1.0009 | 23.880 | 36 |
| 25 | 1.0009 | 23.716 | 35 |
| 26 | 1.0009 | 23.553 | 34 |
| 27 | 1.0009 | 23.393 | 33 |
| 28 | 1.0009 | 23.235 | 32 |
| 29 | 1.0009 | 23.079 | 31 |
| 30 | 1.0010 | 22.926 | 30 |
| 31 | 1.0010 | 22.774 | 29 |
| 32 | 1.0010 | 22.624 | 28 |
| 33 | 1.0010 | 22.476 | 27 |
| 34 | 1.0010 | 22.330 | 26 |
| 35 | 1.0010 | 22.187 | 25 |
| 36 | 1.0010 | 22.044 | 24 |
| 37 | 1.0010 | 21.904 | 23 |
| 38 | 1.0011 | 21.766 | 22 |
| 39 | 1.0011 | 21.629 | 21 |
| 40 | 1.0011 | 21.494 | 20 |
| 41 | 1.0011 | 21.360 | 19 |
| 42 | 1.0011 | 21.229 | 18 |
| 43 | 1.0011 | 21.098 | 17 |
| 44 | 1.0011 | 20.970 | 16 |
| 45 | 1.0012 | 20.843 | 15 |
| 46 | 1.0012 | 20.717 | 14 |
| 47 | 1.0012 | 20.593 | 13 |
| 48 | 1.0012 | 20.471 | 12 |
| 49 | 1.0012 | 20.350 | 11 |
| 50 | 1.0012 | 20.230 | 10 |
| 51 | 1.0012 | 20.112 | 9 |
| 52 | 1.0013 | 19.995 | 8 |
| 53 | 1.0013 | 19.880 | 7 |
| 54 | 1.0013 | 19.766 | 6 |
| 55 | 1.0013 | 19.653 | 5 |
| 56 | 1.0013 | 19.541 | 4 |
| 57 | 1.0013 | 19.431 | 3 |
| 58 | 1.0013 | 19.322 | 2 |
| 59 | 1.0014 | 19.214 | 1 |
| 60 | 1.0014 | 19.107 | 0 |
| ' | Csc | Sec | ' |

90° (270°) (269°) 89° 91° (271°) (268°) 88° 92° (272°) (267°) 87°

NATURAL FUNCTIONS—SECANTS AND COSECANTS (Continued)

3° (183°)
(356°) 176°
4° (184°)
(355°) 175°
5° (185°)
(354°) 174°

| ' | Sec | Csc | ' |
|-----------|--------|--------|-----------|
| 0 | 1.0014 | 19.107 | 60 |
| 1 | 1.0014 | 19.002 | 59 |
| 2 | 1.0014 | 18.898 | 58 |
| 3 | 1.0014 | 18.794 | 57 |
| 4 | 1.0014 | 18.692 | 56 |
| 5 | 1.0014 | 18.591 | 55 |
| 6 | 1.0015 | 18.492 | 54 |
| 7 | 1.0015 | 18.393 | 53 |
| 8 | 1.0015 | 18.295 | 52 |
| 9 | 1.0015 | 18.198 | 51 |
| 10 | 1.0015 | 18.103 | 50 |
| 11 | 1.0015 | 18.008 | 49 |
| 12 | 1.0016 | 17.914 | 48 |
| 13 | 1.0016 | 17.822 | 47 |
| 14 | 1.0016 | 17.730 | 46 |
| 15 | 1.0016 | 17.639 | 45 |
| 16 | 1.0016 | 17.549 | 44 |
| 17 | 1.0016 | 17.460 | 43 |
| 18 | 1.0017 | 17.372 | 42 |
| 19 | 1.0017 | 17.285 | 41 |
| 20 | 1.0017 | 17.198 | 40 |
| 21 | 1.0017 | 17.113 | 39 |
| 22 | 1.0017 | 17.028 | 38 |
| 23 | 1.0017 | 16.945 | 37 |
| 24 | 1.0018 | 16.862 | 36 |
| 25 | 1.0018 | 16.779 | 35 |
| 26 | 1.0018 | 16.698 | 34 |
| 27 | 1.0018 | 16.618 | 33 |
| 28 | 1.0018 | 16.538 | 32 |
| 29 | 1.0019 | 16.459 | 31 |
| 30 | 1.0019 | 16.380 | 30 |
| 31 | 1.0019 | 16.303 | 29 |
| 32 | 1.0019 | 16.226 | 28 |
| 33 | 1.0019 | 16.150 | 27 |
| 34 | 1.0019 | 16.075 | 26 |
| 35 | 1.0020 | 16.000 | 25 |
| 36 | 1.0020 | 15.926 | 24 |
| 37 | 1.0020 | 15.853 | 23 |
| 38 | 1.0020 | 15.780 | 22 |
| 39 | 1.0020 | 15.708 | 21 |
| 40 | 1.0021 | 15.637 | 20 |
| 41 | 1.0021 | 15.566 | 19 |
| 42 | 1.0021 | 15.496 | 18 |
| 43 | 1.0021 | 15.427 | 17 |
| 44 | 1.0021 | 15.358 | 16 |
| 45 | 1.0021 | 15.290 | 15 |
| 46 | 1.0022 | 15.222 | 14 |
| 47 | 1.0022 | 15.155 | 13 |
| 48 | 1.0022 | 15.089 | 12 |
| 49 | 1.0022 | 15.023 | 11 |
| 50 | 1.0022 | 14.958 | 10 |
| 51 | 1.0023 | 14.893 | 9 |
| 52 | 1.0023 | 14.829 | 8 |
| 53 | 1.0023 | 14.766 | 7 |
| 54 | 1.0023 | 14.703 | 6 |
| 55 | 1.0023 | 14.640 | 5 |
| 56 | 1.0024 | 14.578 | 4 |
| 57 | 1.0024 | 14.517 | 3 |
| 58 | 1.0024 | 14.456 | 2 |
| 59 | 1.0024 | 14.395 | 1 |
| 60 | 1.0024 | 14.336 | 0 |
| ' | Csc | Sec | ' |

| ' | Sec | Csc | ' |
|-----------|--------|--------|-----------|
| 0 | 1.0024 | 14.336 | 60 |
| 1 | 1.0025 | 14.276 | 59 |
| 2 | 1.0025 | 14.217 | 58 |
| 3 | 1.0025 | 14.159 | 57 |
| 4 | 1.0025 | 14.101 | 56 |
| 5 | 1.0025 | 14.044 | 55 |
| 6 | 1.0026 | 13.987 | 54 |
| 7 | 1.0026 | 13.930 | 53 |
| 8 | 1.0026 | 13.874 | 52 |
| 9 | 1.0026 | 13.818 | 51 |
| 10 | 1.0027 | 13.763 | 50 |
| 11 | 1.0027 | 13.708 | 49 |
| 12 | 1.0027 | 13.654 | 48 |
| 13 | 1.0027 | 13.600 | 47 |
| 14 | 1.0027 | 13.547 | 46 |
| 15 | 1.0028 | 13.494 | 45 |
| 16 | 1.0028 | 13.441 | 44 |
| 17 | 1.0028 | 13.389 | 43 |
| 18 | 1.0028 | 13.337 | 42 |
| 19 | 1.0028 | 13.286 | 41 |
| 20 | 1.0029 | 13.235 | 40 |
| 21 | 1.0029 | 13.184 | 39 |
| 22 | 1.0029 | 13.134 | 38 |
| 23 | 1.0029 | 13.084 | 37 |
| 24 | 1.0030 | 13.035 | 36 |
| 25 | 1.0030 | 12.985 | 35 |
| 26 | 1.0030 | 12.937 | 34 |
| 27 | 1.0030 | 12.888 | 33 |
| 28 | 1.0030 | 12.840 | 32 |
| 29 | 1.0031 | 12.793 | 31 |
| 30 | 1.0031 | 12.745 | 30 |
| 31 | 1.0031 | 12.699 | 29 |
| 32 | 1.0031 | 12.652 | 28 |
| 33 | 1.0032 | 12.606 | 27 |
| 34 | 1.0032 | 12.560 | 26 |
| 35 | 1.0032 | 12.514 | 25 |
| 36 | 1.0032 | 12.469 | 24 |
| 37 | 1.0033 | 12.424 | 23 |
| 38 | 1.0033 | 12.379 | 22 |
| 39 | 1.0033 | 12.335 | 21 |
| 40 | 1.0033 | 12.291 | 20 |
| 41 | 1.0034 | 12.248 | 19 |
| 42 | 1.0034 | 12.204 | 18 |
| 43 | 1.0034 | 12.161 | 17 |
| 44 | 1.0034 | 12.119 | 16 |
| 45 | 1.0034 | 12.076 | 15 |
| 46 | 1.0035 | 12.034 | 14 |
| 47 | 1.0035 | 11.992 | 13 |
| 48 | 1.0035 | 11.951 | 12 |
| 49 | 1.0035 | 11.909 | 11 |
| 50 | 1.0036 | 11.868 | 10 |
| 51 | 1.0036 | 11.828 | 9 |
| 52 | 1.0036 | 11.787 | 8 |
| 53 | 1.0036 | 11.747 | 7 |
| 54 | 1.0037 | 11.707 | 6 |
| 55 | 1.0037 | 11.668 | 5 |
| 56 | 1.0037 | 11.628 | 4 |
| 57 | 1.0037 | 11.589 | 3 |
| 58 | 1.0038 | 11.551 | 2 |
| 59 | 1.0038 | 11.512 | 1 |
| 60 | 1.0038 | 11.474 | 0 |
| ' | Csc | Sec | ' |

| ' | Sec | Csc | ' |
|-----------|--------|--------|-----------|
| 0 | 1.0038 | 11.474 | 60 |
| 1 | 1.0038 | 11.436 | 59 |
| 2 | 1.0039 | 11.398 | 58 |
| 3 | 1.0039 | 11.360 | 57 |
| 4 | 1.0039 | 11.323 | 56 |
| 5 | 1.0039 | 11.286 | 55 |
| 6 | 1.0040 | 11.249 | 54 |
| 7 | 1.0040 | 11.213 | 53 |
| 8 | 1.0040 | 11.176 | 52 |
| 9 | 1.0041 | 11.140 | 51 |
| 10 | 1.0041 | 11.105 | 50 |
| 11 | 1.0041 | 11.069 | 49 |
| 12 | 1.0041 | 11.034 | 48 |
| 13 | 1.0042 | 10.998 | 47 |
| 14 | 1.0042 | 10.963 | 46 |
| 15 | 1.0042 | 10.929 | 45 |
| 16 | 1.0042 | 10.894 | 44 |
| 17 | 1.0043 | 10.860 | 43 |
| 18 | 1.0043 | 10.826 | 42 |
| 19 | 1.0043 | 10.792 | 41 |
| 20 | 1.0043 | 10.758 | 40 |
| 21 | 1.0044 | 10.725 | 39 |
| 22 | 1.0044 | 10.692 | 38 |
| 23 | 1.0044 | 10.659 | 37 |
| 24 | 1.0045 | 10.626 | 36 |
| 25 | 1.0045 | 10.593 | 35 |
| 26 | 1.0045 | 10.561 | 34 |
| 27 | 1.0045 | 10.529 | 33 |
| 28 | 1.0046 | 10.497 | 32 |
| 29 | 1.0046 | 10.465 | 31 |
| 30 | 1.0046 | 10.433 | 30 |
| 31 | 1.0047 | 10.402 | 29 |
| 32 | 1.0047 | 10.371 | 28 |
| 33 | 1.0047 | 10.340 | 27 |
| 34 | 1.0047 | 10.309 | 26 |
| 35 | 1.0048 | 10.278 | 25 |
| 36 | 1.0048 | 10.248 | 24 |
| 37 | 1.0048 | 10.217 | 23 |
| 38 | 1.0049 | 10.187 | 22 |
| 39 | 1.0049 | 10.157 | 21 |
| 40 | 1.0049 | 10.128 | 20 |
| 41 | 1.0049 | 10.098 | 19 |
| 42 | 1.0050 | 10.068 | 18 |
| 43 | 1.0050 | 10.039 | 17 |
| 44 | 1.0050 | 10.010 | 16 |
| 45 | 1.0051 | 9.9812 | 15 |
| 46 | 1.0051 | 9.9525 | 14 |
| 47 | 1.0051 | 9.9239 | 13 |
| 48 | 1.0051 | 9.8955 | 12 |
| 49 | 1.0052 | 9.8672 | 11 |
| 50 | 1.0052 | 9.8391 | 10 |
| 51 | 1.0052 | 9.8112 | 9 |
| 52 | 1.0053 | 9.7834 | 8 |
| 53 | 1.0053 | 9.7558 | 7 |
| 54 | 1.0053 | 9.7283 | 6 |
| 55 | 1.0054 | 9.7010 | 5 |
| 56 | 1.0054 | 9.6739 | 4 |
| 57 | 1.0054 | 9.6469 | 3 |
| 58 | 1.0054 | 9.6200 | 2 |
| 59 | 1.0055 | 9.5933 | 1 |
| 60 | 1.0055 | 9.5668 | 0 |
| ' | Csc | Sec | ' |

93° (273°)
(266°) 86°
94° (274°)
(265°) 85°
95° (275°)
(264°) 84°

NATURAL FUNCTIONS—SECANTS AND COSECANTS (Continued)

| 6° (186°) | | | | (353°) 173° | | | | 7° (187°) | | | | (352°) 172° | | | | 8° (188°) | | | | (351°) 171° | | | |
|-----------|--------|--------|----|-------------|--------|--------|----|-----------|--------|--------|----|-------------|--------|--------|----|-----------|--------|--------|----|-------------|--------|--------|----|
| ' | Sec | Csc | ' | ' | Sec | Csc | ' | ' | Sec | Csc | ' | ' | Sec | Csc | ' | ' | Sec | Csc | ' | ' | Sec | Csc | ' |
| 0 | 1.0055 | 9.5668 | 60 | 0 | 1.0075 | 8.2055 | 60 | 0 | 1.0098 | 7.1853 | 60 | 0 | 1.0098 | 7.1853 | 60 | 0 | 1.0098 | 7.1853 | 60 | 0 | 1.0098 | 7.1853 | 60 |
| 1 | 1.0055 | 9.5404 | 59 | 1 | 1.0075 | 8.1861 | 59 | 1 | 1.0099 | 7.1705 | 59 | 1 | 1.0099 | 7.1705 | 59 | 1 | 1.0099 | 7.1705 | 59 | 1 | 1.0099 | 7.1705 | 59 |
| 2 | 1.0056 | 9.5141 | 58 | 2 | 1.0076 | 8.1668 | 58 | 2 | 1.0099 | 7.1557 | 58 | 2 | 1.0099 | 7.1557 | 58 | 2 | 1.0100 | 7.1410 | 58 | 2 | 1.0100 | 7.1410 | 58 |
| 3 | 1.0056 | 9.4880 | 57 | 3 | 1.0076 | 8.1476 | 57 | 3 | 1.0100 | 7.1263 | 57 | 3 | 1.0100 | 7.1263 | 57 | 3 | 1.0100 | 7.1263 | 57 | 3 | 1.0100 | 7.1263 | 57 |
| 4 | 1.0056 | 9.4620 | 56 | 4 | 1.0077 | 8.1285 | 56 | 4 | 1.0100 | 7.1117 | 56 | 4 | 1.0100 | 7.1117 | 56 | 4 | 1.0100 | 7.1117 | 56 | 4 | 1.0100 | 7.1117 | 56 |
| 5 | 1.0057 | 9.4362 | 55 | 5 | 1.0077 | 8.1095 | 55 | 5 | 1.0101 | 7.0972 | 55 | 5 | 1.0101 | 7.0972 | 55 | 5 | 1.0101 | 7.0972 | 55 | 5 | 1.0101 | 7.0972 | 55 |
| 6 | 1.0057 | 9.4105 | 54 | 6 | 1.0077 | 8.0905 | 54 | 6 | 1.0101 | 7.0827 | 54 | 6 | 1.0101 | 7.0827 | 54 | 6 | 1.0101 | 7.0827 | 54 | 6 | 1.0101 | 7.0827 | 54 |
| 7 | 1.0057 | 9.3850 | 53 | 7 | 1.0078 | 8.0717 | 53 | 7 | 1.0102 | 7.0683 | 53 | 7 | 1.0102 | 7.0683 | 53 | 7 | 1.0102 | 7.0683 | 53 | 7 | 1.0102 | 7.0683 | 53 |
| 8 | 1.0058 | 9.3596 | 52 | 8 | 1.0078 | 8.0529 | 52 | 8 | 1.0102 | 7.0539 | 52 | 8 | 1.0102 | 7.0539 | 52 | 8 | 1.0102 | 7.0539 | 52 | 8 | 1.0102 | 7.0539 | 52 |
| 9 | 1.0058 | 9.3343 | 51 | 9 | 1.0078 | 8.0342 | 51 | 9 | 1.0102 | 7.0396 | 51 | 9 | 1.0102 | 7.0396 | 51 | 9 | 1.0102 | 7.0396 | 51 | 9 | 1.0102 | 7.0396 | 51 |
| 10 | 1.0058 | 9.3092 | 50 | 10 | 1.0079 | 8.0156 | 50 | 10 | 1.0102 | 7.0254 | 50 | 10 | 1.0102 | 7.0254 | 50 | 10 | 1.0102 | 7.0254 | 50 | 10 | 1.0102 | 7.0254 | 50 |
| 11 | 1.0059 | 9.2842 | 49 | 11 | 1.0079 | 7.9971 | 49 | 11 | 1.0103 | 7.0112 | 49 | 11 | 1.0103 | 7.0112 | 49 | 11 | 1.0103 | 7.0112 | 49 | 11 | 1.0103 | 7.0112 | 49 |
| 12 | 1.0059 | 9.2593 | 48 | 12 | 1.0079 | 7.9787 | 48 | 12 | 1.0103 | 6.9971 | 48 | 12 | 1.0103 | 6.9971 | 48 | 12 | 1.0103 | 6.9971 | 48 | 12 | 1.0103 | 6.9971 | 48 |
| 13 | 1.0059 | 9.2346 | 47 | 13 | 1.0080 | 7.9604 | 47 | 13 | 1.0104 | 6.9830 | 47 | 13 | 1.0104 | 6.9830 | 47 | 13 | 1.0104 | 6.9830 | 47 | 13 | 1.0104 | 6.9830 | 47 |
| 14 | 1.0059 | 9.2100 | 46 | 14 | 1.0080 | 7.9422 | 46 | 14 | 1.0104 | 6.9690 | 46 | 14 | 1.0104 | 6.9690 | 46 | 14 | 1.0104 | 6.9690 | 46 | 14 | 1.0104 | 6.9690 | 46 |
| 15 | 1.0060 | 9.1855 | 45 | 15 | 1.0081 | 7.9240 | 45 | 15 | 1.0105 | 6.9550 | 45 | 15 | 1.0105 | 6.9550 | 45 | 15 | 1.0105 | 6.9550 | 45 | 15 | 1.0105 | 6.9550 | 45 |
| 16 | 1.0060 | 9.1612 | 44 | 16 | 1.0081 | 7.9059 | 44 | 16 | 1.0105 | 6.9411 | 44 | 16 | 1.0105 | 6.9411 | 44 | 16 | 1.0105 | 6.9411 | 44 | 16 | 1.0105 | 6.9411 | 44 |
| 17 | 1.0060 | 9.1370 | 43 | 17 | 1.0081 | 7.8879 | 43 | 17 | 1.0106 | 6.9273 | 43 | 17 | 1.0106 | 6.9273 | 43 | 17 | 1.0106 | 6.9273 | 43 | 17 | 1.0106 | 6.9273 | 43 |
| 18 | 1.0061 | 9.1129 | 42 | 18 | 1.0082 | 7.8700 | 42 | 18 | 1.0106 | 6.9135 | 42 | 18 | 1.0106 | 6.9135 | 42 | 18 | 1.0106 | 6.9135 | 42 | 18 | 1.0106 | 6.9135 | 42 |
| 19 | 1.0061 | 9.0890 | 41 | 19 | 1.0082 | 7.8522 | 41 | 19 | 1.0107 | 6.8998 | 41 | 19 | 1.0107 | 6.8998 | 41 | 19 | 1.0107 | 6.8998 | 41 | 19 | 1.0107 | 6.8998 | 41 |
| 20 | 1.0061 | 9.0652 | 40 | 20 | 1.0082 | 7.8344 | 40 | 20 | 1.0107 | 6.8861 | 40 | 20 | 1.0107 | 6.8861 | 40 | 20 | 1.0107 | 6.8861 | 40 | 20 | 1.0107 | 6.8861 | 40 |
| 21 | 1.0062 | 9.0415 | 39 | 21 | 1.0083 | 7.8168 | 39 | 21 | 1.0108 | 6.8725 | 39 | 21 | 1.0108 | 6.8725 | 39 | 21 | 1.0108 | 6.8725 | 39 | 21 | 1.0108 | 6.8725 | 39 |
| 22 | 1.0062 | 9.0179 | 38 | 22 | 1.0083 | 7.7992 | 38 | 22 | 1.0108 | 6.8589 | 38 | 22 | 1.0108 | 6.8589 | 38 | 22 | 1.0108 | 6.8589 | 38 | 22 | 1.0108 | 6.8589 | 38 |
| 23 | 1.0062 | 8.9944 | 37 | 23 | 1.0084 | 7.7817 | 37 | 23 | 1.0108 | 6.8454 | 37 | 23 | 1.0108 | 6.8454 | 37 | 23 | 1.0108 | 6.8454 | 37 | 23 | 1.0108 | 6.8454 | 37 |
| 24 | 1.0063 | 8.9711 | 36 | 24 | 1.0084 | 7.7642 | 36 | 24 | 1.0109 | 6.8320 | 36 | 24 | 1.0109 | 6.8320 | 36 | 24 | 1.0109 | 6.8320 | 36 | 24 | 1.0109 | 6.8320 | 36 |
| 25 | 1.0063 | 8.9479 | 35 | 25 | 1.0084 | 7.7469 | 35 | 25 | 1.0109 | 6.8186 | 35 | 25 | 1.0109 | 6.8186 | 35 | 25 | 1.0109 | 6.8186 | 35 | 25 | 1.0109 | 6.8186 | 35 |
| 26 | 1.0063 | 8.9248 | 34 | 26 | 1.0085 | 7.7296 | 34 | 26 | 1.0110 | 6.8052 | 34 | 26 | 1.0110 | 6.8052 | 34 | 26 | 1.0110 | 6.8052 | 34 | 26 | 1.0110 | 6.8052 | 34 |
| 27 | 1.0064 | 8.9019 | 33 | 27 | 1.0085 | 7.7124 | 33 | 27 | 1.0110 | 6.7919 | 33 | 27 | 1.0110 | 6.7919 | 33 | 27 | 1.0110 | 6.7919 | 33 | 27 | 1.0110 | 6.7919 | 33 |
| 28 | 1.0064 | 8.8790 | 32 | 28 | 1.0086 | 7.6953 | 32 | 28 | 1.0111 | 6.7787 | 32 | 28 | 1.0111 | 6.7787 | 32 | 28 | 1.0111 | 6.7787 | 32 | 28 | 1.0111 | 6.7787 | 32 |
| 29 | 1.0064 | 8.8563 | 31 | 29 | 1.0086 | 7.6783 | 31 | 29 | 1.0111 | 6.7655 | 31 | 29 | 1.0111 | 6.7655 | 31 | 29 | 1.0111 | 6.7655 | 31 | 29 | 1.0111 | 6.7655 | 31 |
| 30 | 1.0065 | 8.8337 | 30 | 30 | 1.0087 | 7.6613 | 30 | 30 | 1.0112 | 6.7523 | 30 | 30 | 1.0112 | 6.7523 | 30 | 30 | 1.0112 | 6.7523 | 30 | 30 | 1.0112 | 6.7523 | 30 |
| 31 | 1.0065 | 8.8112 | 29 | 31 | 1.0087 | 7.6444 | 29 | 31 | 1.0112 | 6.7392 | 29 | 31 | 1.0112 | 6.7392 | 29 | 31 | 1.0112 | 6.7392 | 29 | 31 | 1.0112 | 6.7392 | 29 |
| 32 | 1.0065 | 8.7888 | 28 | 32 | 1.0087 | 7.6276 | 28 | 32 | 1.0112 | 6.7262 | 28 | 32 | 1.0112 | 6.7262 | 28 | 32 | 1.0112 | 6.7262 | 28 | 32 | 1.0112 | 6.7262 | 28 |
| 33 | 1.0066 | 8.7665 | 27 | 33 | 1.0087 | 7.6109 | 27 | 33 | 1.0113 | 6.7132 | 27 | 33 | 1.0113 | 6.7132 | 27 | 33 | 1.0113 | 6.7132 | 27 | 33 | 1.0113 | 6.7132 | 27 |
| 34 | 1.0066 | 8.7444 | 26 | 34 | 1.0088 | 7.5942 | 26 | 34 | 1.0113 | 6.7003 | 26 | 34 | 1.0113 | 6.7003 | 26 | 34 | 1.0113 | 6.7003 | 26 | 34 | 1.0113 | 6.7003 | 26 |
| 35 | 1.0066 | 8.7223 | 25 | 35 | 1.0088 | 7.5776 | 25 | 35 | 1.0114 | 6.6874 | 25 | 35 | 1.0114 | 6.6874 | 25 | 35 | 1.0114 | 6.6874 | 25 | 35 | 1.0114 | 6.6874 | 25 |
| 36 | 1.0067 | 8.7004 | 24 | 36 | 1.0089 | 7.5611 | 24 | 36 | 1.0114 | 6.6745 | 24 | 36 | 1.0114 | 6.6745 | 24 | 36 | 1.0114 | 6.6745 | 24 | 36 | 1.0114 | 6.6745 | 24 |
| 37 | 1.0067 | 8.6786 | 23 | 37 | 1.0089 | 7.5446 | 23 | 37 | 1.0115 | 6.6618 | 23 | 37 | 1.0115 | 6.6618 | 23 | 37 | 1.0115 | 6.6618 | 23 | 37 | 1.0115 | 6.6618 | 23 |
| 38 | 1.0067 | 8.6569 | 22 | 38 | 1.0089 | 7.5282 | 22 | 38 | 1.0115 | 6.6490 | 22 | 38 | 1.0115 | 6.6490 | 22 | 38 | 1.0115 | 6.6490 | 22 | 38 | 1.0115 | 6.6490 | 22 |
| 39 | 1.0068 | 8.6353 | 21 | 39 | 1.0090 | 7.5119 | 21 | 39 | 1.0115 | 6.6363 | 21 | 39 | 1.0115 | 6.6363 | 21 | 39 | 1.0115 | 6.6363 | 21 | 39 | 1.0115 | 6.6363 | 21 |
| 40 | 1.0068 | 8.6138 | 20 | 40 | 1.0090 | 7.4957 | 20 | 40 | 1.0116 | 6.6237 | 20 | 40 | 1.0116 | 6.6237 | 20 | 40 | 1.0116 | 6.6237 | 20 | 40 | 1.0116 | 6.6237 | 20 |
| 41 | 1.0068 | 8.5924 | 19 | 41 | 1.0091 | 7.4795 | 19 | 41 | 1.0116 | 6.6111 | 19 | 41 | 1.0116 | 6.6111 | 19 | 41 | 1.0116 | 6.6111 | 19 | 41 | 1.0116 | 6.6111 | 19 |
| 42 | 1.0069 | 8.5711 | 18 | 42 | 1.0091 | 7.4635 | 18 | 42 | 1.0117 | 6.5986 | 18 | 42 | 1.0117 | 6.5986 | 18 | 42 | 1.0117 | 6.5986 | 18 | 42 | 1.0117 | 6.5986 | 18 |
| 43 | 1.0069 | 8.5500 | 17 | 43 | 1.0091 | 7.4474 | 17 | 43 | 1.0117 | 6.5861 | 17 | 43 | 1.0117 | 6.5861 | 17 | 43 | 1.0117 | 6.5861 | 17 | 43 | 1.0117 | 6.5861 | 17 |
| 44 | 1.0069 | 8.5289 | 16 | 44 | 1.0092 | 7.4315 | 16 | 44 | 1.0118 | 6.5736 | 16 | 44 | 1.0118 | 6.5736 | 16 | 44 | 1.0118 | 6.5736 | 16 | 44 | 1.0118 | 6.5736 | 16 |
| 45 | 1.0070 | 8.5079 | 15 | 45 | 1.0092 | 7.4156 | 15 | 45 | 1.0118 | 6.5612 | 15 | 45 | 1.0118 | 6.5612 | 15 | 45 | 1.0118 | 6.5612 | 15 | 45 | 1.0118 | 6.5612 | 15 |
| 46 | 1.0070 | 8.4871 | 14 | 46 | 1.0093 | 7.3998 | 14 | 46 | 1.0119 | 6.5489 | 14 | 46 | 1.0119 | 6.5489 | 14 | 46 | 1.0119 | 6.5489 | 14 | 46 | 1.0119 | 6.5489 | 14 |
| 47 | 1.0070 | 8.4663 | 13 | 47 | 1.0093 | 7.3840 | 13 | 47 | 1.0119 | 6.5366 | 13 | 47 | 1.0119 | 6.5366 | 13 | 47 | 1.0119 | 6.5366 | 13 | 47 | 1.0119 | 6.5366 | 13 |
| 48 | 1.0071 | 8.4457 | 12 | 48 | 1.0093 | 7.3684 | 12 | 48 | 1.0120 | 6.5243 | 12 | 48 | 1.0120 | 6.5243 | 12 | 48 | 1.0120 | 6.5243 | 12 | 48 | 1.0120 | 6.5243 | 12 |
| 49 | 1.0071 | 8.4251 | 11 | 49 | 1.0094 | 7.3527 | 11 | 49 | 1.0120 | 6.5121 | 11 | 49 | 1.0120 | 6.5121 | 11 | 49 | 1.0120 | 6.5121 | 11 | 49 | 1.0120 | 6.5121 | 11 |
| 50 | 1.0072 | 8.4047 | 10 | 50 | 1.0094 | 7.3372 | 10 | 50 | 1.0121 | 6.4999 | 10 | 50 | 1.0121 | 6.4999 | 10 | 50 | 1.0121 | 6.4999 | 10 | 50 | 1.0121 | 6.4999 | 10 |
| 51 | 1.0072 | 8.3843 | 9 | 51 | 1.0095 | 7.3217 | 9 | 51 | 1.0121 | 6.4878 | 9 | 51 | 1.0121 | 6.4878 | 9 | 51 | 1.0121 | 6.4878 | 9 | 51 | 1.0121 | 6.4878 | 9 |
| 52 | 1.0072 | 8.3641 | 8 | 52 | 1.0095 | 7.3063 | 8 | 52 | 1.0122 | 6.4757 | 8 | 52 | 1.0122 | 6.4757 | 8 | 52 | 1.0122 | 6.4757 | 8 | 52 | 1.0122 | 6.4757 | 8 |
| 53 | 1.0073 | 8.3439 | 7 | 53 | 1.0095 | 7.2909 | 7 | 53 | 1.0122 | 6.4637 | 7 | 53 | 1.0122 | 6.4637 | 7 | 53 | 1.0122 | 6.4637 | 7 | 53 | 1.0122 | 6.4637 | 7 |
| 54 | 1.0073 | | | | | | | | | | | | | | | | | | | | | | |

NATURAL FUNCTIONS—SECANTS AND COSECANTS (Continued)

9° (189°) (350°) 170° 10° (190°) (349°) 169° 11° (191°) (348°) 168°

| ' | Sec | Csc | ' | ' | Sec | Csc | ' | ' | Sec | Csc | ' |
|----|--------|--------|----|----|--------|--------|----|----|--------|--------|----|
| 0 | 1.0125 | 6.3925 | 60 | 0 | 1.0154 | 5.7588 | 60 | 0 | 1.0187 | 5.2408 | 60 |
| 1 | 1.0125 | 6.3807 | 59 | 1 | 1.0155 | 5.7493 | 59 | 1 | 1.0188 | 5.2330 | 59 |
| 2 | 1.0126 | 6.3691 | 58 | 2 | 1.0155 | 5.7398 | 58 | 2 | 1.0188 | 5.2252 | 58 |
| 3 | 1.0126 | 6.3574 | 57 | 3 | 1.0156 | 5.7304 | 57 | 3 | 1.0189 | 5.2174 | 57 |
| 4 | 1.0127 | 6.3458 | 56 | 4 | 1.0156 | 5.7210 | 56 | 4 | 1.0189 | 5.2097 | 56 |
| 5 | 1.0127 | 6.3343 | 55 | 5 | 1.0157 | 5.7117 | 55 | 5 | 1.0190 | 5.2019 | 55 |
| 6 | 1.0127 | 6.3228 | 54 | 6 | 1.0157 | 5.7023 | 54 | 6 | 1.0191 | 5.1942 | 54 |
| 7 | 1.0128 | 6.3113 | 53 | 7 | 1.0158 | 5.6930 | 53 | 7 | 1.0191 | 5.1865 | 53 |
| 8 | 1.0128 | 6.2999 | 52 | 8 | 1.0158 | 5.6838 | 52 | 8 | 1.0192 | 5.1789 | 52 |
| 9 | 1.0129 | 6.2885 | 51 | 9 | 1.0159 | 5.6745 | 51 | 9 | 1.0192 | 5.1712 | 51 |
| 10 | 1.0129 | 6.2772 | 50 | 10 | 1.0160 | 5.6653 | 50 | 10 | 1.0193 | 5.1636 | 50 |
| 11 | 1.0130 | 6.2659 | 49 | 11 | 1.0160 | 5.6562 | 49 | 11 | 1.0194 | 5.1560 | 49 |
| 12 | 1.0130 | 6.2546 | 48 | 12 | 1.0161 | 5.6470 | 48 | 12 | 1.0194 | 5.1484 | 48 |
| 13 | 1.0131 | 6.2434 | 47 | 13 | 1.0161 | 5.6379 | 47 | 13 | 1.0195 | 5.1409 | 47 |
| 14 | 1.0131 | 6.2323 | 46 | 14 | 1.0162 | 5.6288 | 46 | 14 | 1.0195 | 5.1333 | 46 |
| 15 | 1.0132 | 6.2211 | 45 | 15 | 1.0162 | 5.6198 | 45 | 15 | 1.0196 | 5.1258 | 45 |
| 16 | 1.0132 | 6.2100 | 44 | 16 | 1.0163 | 5.6107 | 44 | 16 | 1.0197 | 5.1183 | 44 |
| 17 | 1.0133 | 6.1990 | 43 | 17 | 1.0163 | 5.6017 | 43 | 17 | 1.0197 | 5.1109 | 43 |
| 18 | 1.0133 | 6.1880 | 42 | 18 | 1.0164 | 5.5928 | 42 | 18 | 1.0198 | 5.1034 | 42 |
| 19 | 1.0134 | 6.1770 | 41 | 19 | 1.0164 | 5.5838 | 41 | 19 | 1.0198 | 5.0960 | 41 |
| 20 | 1.0134 | 6.1661 | 40 | 20 | 1.0165 | 5.5749 | 40 | 20 | 1.0199 | 5.0886 | 40 |
| 21 | 1.0135 | 6.1552 | 39 | 21 | 1.0165 | 5.5660 | 39 | 21 | 1.0199 | 5.0813 | 39 |
| 22 | 1.0135 | 6.1443 | 38 | 22 | 1.0166 | 5.5572 | 38 | 22 | 1.0200 | 5.0739 | 38 |
| 23 | 1.0136 | 6.1335 | 37 | 23 | 1.0166 | 5.5484 | 37 | 23 | 1.0201 | 5.0666 | 37 |
| 24 | 1.0136 | 6.1227 | 36 | 24 | 1.0167 | 5.5396 | 36 | 24 | 1.0201 | 5.0593 | 36 |
| 25 | 1.0137 | 6.1120 | 35 | 25 | 1.0168 | 5.5308 | 35 | 25 | 1.0202 | 5.0520 | 35 |
| 26 | 1.0137 | 6.1013 | 34 | 26 | 1.0168 | 5.5221 | 34 | 26 | 1.0202 | 5.0447 | 34 |
| 27 | 1.0138 | 6.0906 | 33 | 27 | 1.0169 | 5.5134 | 33 | 27 | 1.0203 | 5.0375 | 33 |
| 28 | 1.0138 | 6.0800 | 32 | 28 | 1.0169 | 5.5047 | 32 | 28 | 1.0204 | 5.0302 | 32 |
| 29 | 1.0139 | 6.0694 | 31 | 29 | 1.0170 | 5.4960 | 31 | 29 | 1.0204 | 5.0230 | 31 |
| 30 | 1.0139 | 6.0589 | 30 | 30 | 1.0170 | 5.4874 | 30 | 30 | 1.0205 | 5.0159 | 30 |
| 31 | 1.0140 | 6.0483 | 29 | 31 | 1.0171 | 5.4788 | 29 | 31 | 1.0205 | 5.0087 | 29 |
| 32 | 1.0140 | 6.0379 | 28 | 32 | 1.0171 | 5.4702 | 28 | 32 | 1.0206 | 5.0016 | 28 |
| 33 | 1.0141 | 6.0274 | 27 | 33 | 1.0172 | 5.4617 | 27 | 33 | 1.0207 | 4.9944 | 27 |
| 34 | 1.0141 | 6.0170 | 26 | 34 | 1.0173 | 5.4532 | 26 | 34 | 1.0207 | 4.9873 | 26 |
| 35 | 1.0142 | 6.0067 | 25 | 35 | 1.0173 | 5.4447 | 25 | 35 | 1.0208 | 4.9803 | 25 |
| 36 | 1.0142 | 5.9963 | 24 | 36 | 1.0174 | 5.4362 | 24 | 36 | 1.0209 | 4.9732 | 24 |
| 37 | 1.0143 | 5.9860 | 23 | 37 | 1.0174 | 5.4278 | 23 | 37 | 1.0209 | 4.9662 | 23 |
| 38 | 1.0143 | 5.9758 | 22 | 38 | 1.0175 | 5.4194 | 22 | 38 | 1.0210 | 4.9591 | 22 |
| 39 | 1.0144 | 5.9656 | 21 | 39 | 1.0175 | 5.4110 | 21 | 39 | 1.0210 | 4.9521 | 21 |
| 40 | 1.0144 | 5.9554 | 20 | 40 | 1.0176 | 5.4026 | 20 | 40 | 1.0211 | 4.9452 | 20 |
| 41 | 1.0145 | 5.9452 | 19 | 41 | 1.0176 | 5.3943 | 19 | 41 | 1.0212 | 4.9382 | 19 |
| 42 | 1.0145 | 5.9351 | 18 | 42 | 1.0177 | 5.3860 | 18 | 42 | 1.0212 | 4.9313 | 18 |
| 43 | 1.0146 | 5.9250 | 17 | 43 | 1.0178 | 5.3777 | 17 | 43 | 1.0213 | 4.9244 | 17 |
| 44 | 1.0146 | 5.9150 | 16 | 44 | 1.0178 | 5.3695 | 16 | 44 | 1.0213 | 4.9175 | 16 |
| 45 | 1.0147 | 5.9049 | 15 | 45 | 1.0179 | 5.3612 | 15 | 45 | 1.0214 | 4.9106 | 15 |
| 46 | 1.0147 | 5.8950 | 14 | 46 | 1.0179 | 5.3530 | 14 | 46 | 1.0215 | 4.9037 | 14 |
| 47 | 1.0148 | 5.8850 | 13 | 47 | 1.0180 | 5.3449 | 13 | 47 | 1.0215 | 4.8969 | 13 |
| 48 | 1.0148 | 5.8751 | 12 | 48 | 1.0180 | 5.3367 | 12 | 48 | 1.0216 | 4.8901 | 12 |
| 49 | 1.0149 | 5.8652 | 11 | 49 | 1.0181 | 5.3286 | 11 | 49 | 1.0217 | 4.8833 | 11 |
| 50 | 1.0149 | 5.8554 | 10 | 50 | 1.0181 | 5.3205 | 10 | 50 | 1.0217 | 4.8765 | 10 |
| 51 | 1.0150 | 5.8456 | 9 | 51 | 1.0182 | 5.3124 | 9 | 51 | 1.0218 | 4.8697 | 9 |
| 52 | 1.0150 | 5.8358 | 8 | 52 | 1.0183 | 5.3044 | 8 | 52 | 1.0218 | 4.8630 | 8 |
| 53 | 1.0151 | 5.8261 | 7 | 53 | 1.0183 | 5.2963 | 7 | 53 | 1.0219 | 4.8563 | 7 |
| 54 | 1.0151 | 5.8164 | 6 | 54 | 1.0184 | 5.2883 | 6 | 54 | 1.0220 | 4.8496 | 6 |
| 55 | 1.0152 | 5.8067 | 5 | 55 | 1.0184 | 5.2804 | 5 | 55 | 1.0220 | 4.8429 | 5 |
| 56 | 1.0152 | 5.7970 | 4 | 56 | 1.0185 | 5.2724 | 4 | 56 | 1.0221 | 4.8362 | 4 |
| 57 | 1.0153 | 5.7874 | 3 | 57 | 1.0185 | 5.2645 | 3 | 57 | 1.0222 | 4.8296 | 3 |
| 58 | 1.0153 | 5.7778 | 2 | 58 | 1.0186 | 5.2566 | 2 | 58 | 1.0222 | 4.8229 | 2 |
| 59 | 1.0154 | 5.7683 | 1 | 59 | 1.0187 | 5.2487 | 1 | 59 | 1.0223 | 4.8163 | 1 |
| 60 | 1.0154 | 5.7588 | 0 | 60 | 1.0187 | 5.2408 | 0 | 60 | 1.0223 | 4.8097 | 0 |
| ' | Csc | Sec | ' | ' | Csc | Sec | ' | ' | Csc | Sec | ' |

99° (279°) (260°) 80° 100° (280°) (259°) 79° 101° (281°) (258°) 78°

NATURAL FUNCTIONS—SECANTS AND COSECANTS (Continued)

12° (192°)

(347°) 167°

13° (193°)

(346°) 166°

14° (194°)

(345°) 165°

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.0223 | 4.8097 | 60 |
| 1 | 1.0224 | 4.8032 | 59 |
| 2 | 1.0225 | 4.7966 | 58 |
| 3 | 1.0225 | 4.7901 | 57 |
| 4 | 1.0226 | 4.7836 | 56 |
| 5 | 1.0227 | 4.7771 | 55 |
| 6 | 1.0227 | 4.7706 | 54 |
| 7 | 1.0228 | 4.7641 | 53 |
| 8 | 1.0228 | 4.7577 | 52 |
| 9 | 1.0229 | 4.7512 | 51 |
| 10 | 1.0230 | 4.7448 | 50 |
| 11 | 1.0230 | 4.7384 | 49 |
| 12 | 1.0231 | 4.7321 | 48 |
| 13 | 1.0232 | 4.7257 | 47 |
| 14 | 1.0232 | 4.7194 | 46 |
| 15 | 1.0233 | 4.7130 | 45 |
| 16 | 1.0234 | 4.7067 | 44 |
| 17 | 1.0234 | 4.7004 | 43 |
| 18 | 1.0235 | 4.6942 | 42 |
| 19 | 1.0236 | 4.6879 | 41 |
| 20 | 1.0236 | 4.6817 | 40 |
| 21 | 1.0237 | 4.6755 | 39 |
| 22 | 1.0238 | 4.6693 | 38 |
| 23 | 1.0238 | 4.6631 | 37 |
| 24 | 1.0239 | 4.6569 | 36 |
| 25 | 1.0240 | 4.6507 | 35 |
| 26 | 1.0240 | 4.6446 | 34 |
| 27 | 1.0241 | 4.6385 | 33 |
| 28 | 1.0241 | 4.6324 | 32 |
| 29 | 1.0242 | 4.6263 | 31 |
| 30 | 1.0243 | 4.6202 | 30 |
| 31 | 1.0243 | 4.6142 | 29 |
| 32 | 1.0244 | 4.6081 | 28 |
| 33 | 1.0245 | 4.6021 | 27 |
| 34 | 1.0245 | 4.5961 | 26 |
| 35 | 1.0246 | 4.5901 | 25 |
| 36 | 1.0247 | 4.5841 | 24 |
| 37 | 1.0247 | 4.5782 | 23 |
| 38 | 1.0248 | 4.5722 | 22 |
| 39 | 1.0249 | 4.5663 | 21 |
| 40 | 1.0249 | 4.5604 | 20 |
| 41 | 1.0250 | 4.5545 | 19 |
| 42 | 1.0251 | 4.5486 | 18 |
| 43 | 1.0251 | 4.5428 | 17 |
| 44 | 1.0252 | 4.5369 | 16 |
| 45 | 1.0253 | 4.5311 | 15 |
| 46 | 1.0253 | 4.5253 | 14 |
| 47 | 1.0254 | 4.5195 | 13 |
| 48 | 1.0255 | 4.5137 | 12 |
| 49 | 1.0256 | 4.5079 | 11 |
| 50 | 1.0256 | 4.5022 | 10 |
| 51 | 1.0257 | 4.4964 | 9 |
| 52 | 1.0258 | 4.4907 | 8 |
| 53 | 1.0258 | 4.4850 | 7 |
| 54 | 1.0259 | 4.4793 | 6 |
| 55 | 1.0260 | 4.4736 | 5 |
| 56 | 1.0260 | 4.4679 | 4 |
| 57 | 1.0261 | 4.4623 | 3 |
| 58 | 1.0262 | 4.4566 | 2 |
| 59 | 1.0262 | 4.4510 | 1 |
| 60 | 1.0263 | 4.4454 | 0 |
| ' | Csc | Sec | ' |

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.0263 | 4.4454 | 60 |
| 1 | 1.0264 | 4.4398 | 59 |
| 2 | 1.0264 | 4.4342 | 58 |
| 3 | 1.0265 | 4.4287 | 57 |
| 4 | 1.0266 | 4.4231 | 56 |
| 5 | 1.0266 | 4.4176 | 55 |
| 6 | 1.0267 | 4.4121 | 54 |
| 7 | 1.0268 | 4.4066 | 53 |
| 8 | 1.0269 | 4.4011 | 52 |
| 9 | 1.0269 | 4.3956 | 51 |
| 10 | 1.0270 | 4.3901 | 50 |
| 11 | 1.0271 | 4.3847 | 49 |
| 12 | 1.0271 | 4.3792 | 48 |
| 13 | 1.0272 | 4.3738 | 47 |
| 14 | 1.0273 | 4.3684 | 46 |
| 15 | 1.0273 | 4.3630 | 45 |
| 16 | 1.0274 | 4.3576 | 44 |
| 17 | 1.0275 | 4.3522 | 43 |
| 18 | 1.0276 | 4.3469 | 42 |
| 19 | 1.0276 | 4.3415 | 41 |
| 20 | 1.0277 | 4.3362 | 40 |
| 21 | 1.0278 | 4.3309 | 39 |
| 22 | 1.0278 | 4.3256 | 38 |
| 23 | 1.0279 | 4.3203 | 37 |
| 24 | 1.0280 | 4.3150 | 36 |
| 25 | 1.0281 | 4.3098 | 35 |
| 26 | 1.0281 | 4.3045 | 34 |
| 27 | 1.0282 | 4.2993 | 33 |
| 28 | 1.0283 | 4.2941 | 32 |
| 29 | 1.0283 | 4.2889 | 31 |
| 30 | 1.0284 | 4.2837 | 30 |
| 31 | 1.0285 | 4.2785 | 29 |
| 32 | 1.0286 | 4.2733 | 28 |
| 33 | 1.0286 | 4.2681 | 27 |
| 34 | 1.0287 | 4.2630 | 26 |
| 35 | 1.0288 | 4.2579 | 25 |
| 36 | 1.0288 | 4.2527 | 24 |
| 37 | 1.0289 | 4.2476 | 23 |
| 38 | 1.0290 | 4.2425 | 22 |
| 39 | 1.0291 | 4.2375 | 21 |
| 40 | 1.0291 | 4.2324 | 20 |
| 41 | 1.0292 | 4.2273 | 19 |
| 42 | 1.0293 | 4.2223 | 18 |
| 43 | 1.0294 | 4.2173 | 17 |
| 44 | 1.0294 | 4.2122 | 16 |
| 45 | 1.0295 | 4.2072 | 15 |
| 46 | 1.0296 | 4.2022 | 14 |
| 47 | 1.0297 | 4.1973 | 13 |
| 48 | 1.0297 | 4.1923 | 12 |
| 49 | 1.0298 | 4.1873 | 11 |
| 50 | 1.0299 | 4.1824 | 10 |
| 51 | 1.0299 | 4.1774 | 9 |
| 52 | 1.0300 | 4.1725 | 8 |
| 53 | 1.0301 | 4.1676 | 7 |
| 54 | 1.0302 | 4.1627 | 6 |
| 55 | 1.0302 | 4.1578 | 5 |
| 56 | 1.0303 | 4.1529 | 4 |
| 57 | 1.0304 | 4.1481 | 3 |
| 58 | 1.0305 | 4.1432 | 2 |
| 59 | 1.0305 | 4.1384 | 1 |
| 60 | 1.0306 | 4.1336 | 0 |
| ' | Csc | Sec | ' |

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.0306 | 4.1336 | 60 |
| 1 | 1.0307 | 4.1287 | 59 |
| 2 | 1.0308 | 4.1239 | 58 |
| 3 | 1.0308 | 4.1191 | 57 |
| 4 | 1.0309 | 4.1144 | 56 |
| 5 | 1.0310 | 4.1096 | 55 |
| 6 | 1.0311 | 4.1048 | 54 |
| 7 | 1.0311 | 4.1001 | 53 |
| 8 | 1.0312 | 4.0954 | 52 |
| 9 | 1.0313 | 4.0906 | 51 |
| 10 | 1.0314 | 4.0859 | 50 |
| 11 | 1.0314 | 4.0812 | 49 |
| 12 | 1.0315 | 4.0765 | 48 |
| 13 | 1.0316 | 4.0718 | 47 |
| 14 | 1.0317 | 4.0672 | 46 |
| 15 | 1.0317 | 4.0625 | 45 |
| 16 | 1.0318 | 4.0579 | 44 |
| 17 | 1.0319 | 4.0532 | 43 |
| 18 | 1.0320 | 4.0486 | 42 |
| 19 | 1.0321 | 4.0440 | 41 |
| 20 | 1.0321 | 4.0394 | 40 |
| 21 | 1.0322 | 4.0348 | 39 |
| 22 | 1.0323 | 4.0302 | 38 |
| 23 | 1.0324 | 4.0256 | 37 |
| 24 | 1.0324 | 4.0211 | 36 |
| 25 | 1.0325 | 4.0165 | 35 |
| 26 | 1.0326 | 4.0120 | 34 |
| 27 | 1.0327 | 4.0075 | 33 |
| 28 | 1.0327 | 4.0029 | 32 |
| 29 | 1.0328 | 3.9984 | 31 |
| 30 | 1.0329 | 3.9939 | 30 |
| 31 | 1.0330 | 3.9894 | 29 |
| 32 | 1.0331 | 3.9850 | 28 |
| 33 | 1.0331 | 3.9805 | 27 |
| 34 | 1.0332 | 3.9760 | 26 |
| 35 | 1.0333 | 3.9716 | 25 |
| 36 | 1.0334 | 3.9672 | 24 |
| 37 | 1.0334 | 3.9627 | 23 |
| 38 | 1.0335 | 3.9583 | 22 |
| 39 | 1.0336 | 3.9539 | 21 |
| 40 | 1.0337 | 3.9495 | 20 |
| 41 | 1.0338 | 3.9451 | 19 |
| 42 | 1.0338 | 3.9408 | 18 |
| 43 | 1.0339 | 3.9364 | 17 |
| 44 | 1.0340 | 3.9320 | 16 |
| 45 | 1.0341 | 3.9277 | 15 |
| 46 | 1.0342 | 3.9234 | 14 |
| 47 | 1.0342 | 3.9190 | 13 |
| 48 | 1.0343 | 3.9147 | 12 |
| 49 | 1.0344 | 3.9104 | 11 |
| 50 | 1.0345 | 3.9061 | 10 |
| 51 | 1.0346 | 3.9018 | 9 |
| 52 | 1.0346 | 3.8976 | 8 |
| 53 | 1.0347 | 3.8933 | 7 |
| 54 | 1.0348 | 3.8890 | 6 |
| 55 | 1.0349 | 3.8848 | 5 |
| 56 | 1.0350 | 3.8806 | 4 |
| 57 | 1.0350 | 3.8763 | 3 |
| 58 | 1.0351 | 3.8721 | 2 |
| 59 | 1.0352 | 3.8679 | 1 |
| 60 | 1.0353 | 3.8637 | 0 |
| ' | Csc | Sec | ' |

102° (282°)

(257°) 77°

103° (283°)

(256°) 76°

104° (284°)

(255°) 75°

NATURAL FUNCTIONS—SECANTS AND COSECANTS (Continued)

| 15° (195°) | | | | (344°) 164° | | | | 16° (196°) | | | | (343°) 163° | | | | 17° (197°) | | | | (342°) 162° | | | |
|------------|--------|--------|----|-------------|--------|--------|----|------------|--------|--------|----|-------------|--------|--------|----|------------|--------|--------|----|-------------|--------|--------|----|
| ' | Sec | Csc | ' | ' | Sec | Csc | ' | ' | Sec | Csc | ' | ' | Sec | Csc | ' | ' | Sec | Csc | ' | ' | Sec | Csc | ' |
| 0 | 1.0353 | 3.8637 | 60 | 0 | 1.0403 | 3.6280 | 60 | 0 | 1.0457 | 3.4203 | 60 | 0 | 1.0457 | 3.4203 | 60 | 0 | 1.0457 | 3.4203 | 60 | 0 | 1.0457 | 3.4203 | 60 |
| 1 | 1.0354 | 3.8595 | 59 | 1 | 1.0404 | 3.6243 | 59 | 1 | 1.0458 | 3.4171 | 59 | 1 | 1.0458 | 3.4171 | 59 | 1 | 1.0458 | 3.4171 | 59 | 1 | 1.0458 | 3.4171 | 59 |
| 2 | 1.0354 | 3.8553 | 58 | 2 | 1.0405 | 3.6206 | 58 | 2 | 1.0459 | 3.4138 | 58 | 2 | 1.0459 | 3.4138 | 58 | 2 | 1.0459 | 3.4138 | 58 | 2 | 1.0459 | 3.4138 | 58 |
| 3 | 1.0355 | 3.8512 | 57 | 3 | 1.0406 | 3.6169 | 57 | 3 | 1.0460 | 3.4106 | 57 | 3 | 1.0460 | 3.4106 | 57 | 3 | 1.0460 | 3.4106 | 57 | 3 | 1.0460 | 3.4106 | 57 |
| 4 | 1.0356 | 3.8470 | 56 | 4 | 1.0406 | 3.6133 | 56 | 4 | 1.0461 | 3.4073 | 56 | 4 | 1.0461 | 3.4073 | 56 | 4 | 1.0461 | 3.4073 | 56 | 4 | 1.0461 | 3.4073 | 56 |
| 5 | 1.0357 | 3.8428 | 55 | 5 | 1.0407 | 3.6097 | 55 | 5 | 1.0462 | 3.4041 | 55 | 5 | 1.0462 | 3.4041 | 55 | 5 | 1.0462 | 3.4041 | 55 | 5 | 1.0462 | 3.4041 | 55 |
| 6 | 1.0358 | 3.8387 | 54 | 6 | 1.0408 | 3.6060 | 54 | 6 | 1.0463 | 3.4009 | 54 | 6 | 1.0463 | 3.4009 | 54 | 6 | 1.0463 | 3.4009 | 54 | 6 | 1.0463 | 3.4009 | 54 |
| 7 | 1.0358 | 3.8346 | 53 | 7 | 1.0409 | 3.6024 | 53 | 7 | 1.0463 | 3.3977 | 53 | 7 | 1.0463 | 3.3977 | 53 | 7 | 1.0463 | 3.3977 | 53 | 7 | 1.0463 | 3.3977 | 53 |
| 8 | 1.0359 | 3.8304 | 52 | 8 | 1.0410 | 3.5988 | 52 | 8 | 1.0464 | 3.3945 | 52 | 8 | 1.0464 | 3.3945 | 52 | 8 | 1.0464 | 3.3945 | 52 | 8 | 1.0464 | 3.3945 | 52 |
| 9 | 1.0360 | 3.8263 | 51 | 9 | 1.0411 | 3.5951 | 51 | 9 | 1.0465 | 3.3913 | 51 | 9 | 1.0465 | 3.3913 | 51 | 9 | 1.0465 | 3.3913 | 51 | 9 | 1.0465 | 3.3913 | 51 |
| 10 | 1.0361 | 3.8222 | 50 | 10 | 1.0412 | 3.5915 | 50 | 10 | 1.0466 | 3.3881 | 50 | 10 | 1.0466 | 3.3881 | 50 | 10 | 1.0466 | 3.3881 | 50 | 10 | 1.0466 | 3.3881 | 50 |
| 11 | 1.0362 | 3.8181 | 49 | 11 | 1.0413 | 3.5879 | 49 | 11 | 1.0467 | 3.3849 | 49 | 11 | 1.0467 | 3.3849 | 49 | 11 | 1.0467 | 3.3849 | 49 | 11 | 1.0467 | 3.3849 | 49 |
| 12 | 1.0363 | 3.8140 | 48 | 12 | 1.0413 | 3.5843 | 48 | 12 | 1.0468 | 3.3817 | 48 | 12 | 1.0468 | 3.3817 | 48 | 12 | 1.0468 | 3.3817 | 48 | 12 | 1.0468 | 3.3817 | 48 |
| 13 | 1.0363 | 3.8100 | 47 | 13 | 1.0414 | 3.5808 | 47 | 13 | 1.0469 | 3.3785 | 47 | 13 | 1.0469 | 3.3785 | 47 | 13 | 1.0469 | 3.3785 | 47 | 13 | 1.0469 | 3.3785 | 47 |
| 14 | 1.0364 | 3.8059 | 46 | 14 | 1.0415 | 3.5772 | 46 | 14 | 1.0470 | 3.3754 | 46 | 14 | 1.0470 | 3.3754 | 46 | 14 | 1.0470 | 3.3754 | 46 | 14 | 1.0470 | 3.3754 | 46 |
| 15 | 1.0365 | 3.8018 | 45 | 15 | 1.0416 | 3.5736 | 45 | 15 | 1.0471 | 3.3722 | 45 | 15 | 1.0471 | 3.3722 | 45 | 15 | 1.0471 | 3.3722 | 45 | 15 | 1.0471 | 3.3722 | 45 |
| 16 | 1.0366 | 3.7978 | 44 | 16 | 1.0417 | 3.5700 | 44 | 16 | 1.0472 | 3.3691 | 44 | 16 | 1.0472 | 3.3691 | 44 | 16 | 1.0472 | 3.3691 | 44 | 16 | 1.0472 | 3.3691 | 44 |
| 17 | 1.0367 | 3.7937 | 43 | 17 | 1.0418 | 3.5665 | 43 | 17 | 1.0473 | 3.3659 | 43 | 17 | 1.0473 | 3.3659 | 43 | 17 | 1.0473 | 3.3659 | 43 | 17 | 1.0473 | 3.3659 | 43 |
| 18 | 1.0367 | 3.7897 | 42 | 18 | 1.0419 | 3.5629 | 42 | 18 | 1.0474 | 3.3628 | 42 | 18 | 1.0474 | 3.3628 | 42 | 18 | 1.0474 | 3.3628 | 42 | 18 | 1.0474 | 3.3628 | 42 |
| 19 | 1.0368 | 3.7857 | 41 | 19 | 1.0420 | 3.5594 | 41 | 19 | 1.0475 | 3.3596 | 41 | 19 | 1.0475 | 3.3596 | 41 | 19 | 1.0475 | 3.3596 | 41 | 19 | 1.0475 | 3.3596 | 41 |
| 20 | 1.0369 | 3.7817 | 40 | 20 | 1.0421 | 3.5559 | 40 | 20 | 1.0476 | 3.3565 | 40 | 20 | 1.0476 | 3.3565 | 40 | 20 | 1.0476 | 3.3565 | 40 | 20 | 1.0476 | 3.3565 | 40 |
| 21 | 1.0370 | 3.7777 | 39 | 21 | 1.0421 | 3.5523 | 39 | 21 | 1.0477 | 3.3534 | 39 | 21 | 1.0477 | 3.3534 | 39 | 21 | 1.0477 | 3.3534 | 39 | 21 | 1.0477 | 3.3534 | 39 |
| 22 | 1.0371 | 3.7737 | 38 | 22 | 1.0422 | 3.5488 | 38 | 22 | 1.0478 | 3.3502 | 38 | 22 | 1.0478 | 3.3502 | 38 | 22 | 1.0478 | 3.3502 | 38 | 22 | 1.0478 | 3.3502 | 38 |
| 23 | 1.0372 | 3.7697 | 37 | 23 | 1.0423 | 3.5453 | 37 | 23 | 1.0479 | 3.3471 | 37 | 23 | 1.0479 | 3.3471 | 37 | 23 | 1.0479 | 3.3471 | 37 | 23 | 1.0479 | 3.3471 | 37 |
| 24 | 1.0372 | 3.7657 | 36 | 24 | 1.0424 | 3.5418 | 36 | 24 | 1.0480 | 3.3440 | 36 | 24 | 1.0480 | 3.3440 | 36 | 24 | 1.0480 | 3.3440 | 36 | 24 | 1.0480 | 3.3440 | 36 |
| 25 | 1.0373 | 3.7617 | 35 | 25 | 1.0425 | 3.5383 | 35 | 25 | 1.0481 | 3.3409 | 35 | 25 | 1.0481 | 3.3409 | 35 | 25 | 1.0481 | 3.3409 | 35 | 25 | 1.0481 | 3.3409 | 35 |
| 26 | 1.0374 | 3.7577 | 34 | 26 | 1.0426 | 3.5348 | 34 | 26 | 1.0482 | 3.3378 | 34 | 26 | 1.0482 | 3.3378 | 34 | 26 | 1.0482 | 3.3378 | 34 | 26 | 1.0482 | 3.3378 | 34 |
| 27 | 1.0375 | 3.7538 | 33 | 27 | 1.0427 | 3.5313 | 33 | 27 | 1.0483 | 3.3347 | 33 | 27 | 1.0483 | 3.3347 | 33 | 27 | 1.0483 | 3.3347 | 33 | 27 | 1.0483 | 3.3347 | 33 |
| 28 | 1.0376 | 3.7498 | 32 | 28 | 1.0428 | 3.5279 | 32 | 28 | 1.0484 | 3.3317 | 32 | 28 | 1.0484 | 3.3317 | 32 | 28 | 1.0484 | 3.3317 | 32 | 28 | 1.0484 | 3.3317 | 32 |
| 29 | 1.0377 | 3.7459 | 31 | 29 | 1.0429 | 3.5244 | 31 | 29 | 1.0485 | 3.3286 | 31 | 29 | 1.0485 | 3.3286 | 31 | 29 | 1.0485 | 3.3286 | 31 | 29 | 1.0485 | 3.3286 | 31 |
| 30 | 1.0377 | 3.7420 | 30 | 30 | 1.0429 | 3.5209 | 30 | 30 | 1.0486 | 3.3255 | 30 | 30 | 1.0486 | 3.3255 | 30 | 30 | 1.0486 | 3.3255 | 30 | 30 | 1.0486 | 3.3255 | 30 |
| 31 | 1.0378 | 3.7381 | 29 | 31 | 1.0430 | 3.5175 | 29 | 31 | 1.0487 | 3.3224 | 29 | 31 | 1.0487 | 3.3224 | 29 | 31 | 1.0487 | 3.3224 | 29 | 31 | 1.0487 | 3.3224 | 29 |
| 32 | 1.0379 | 3.7341 | 28 | 32 | 1.0431 | 3.5140 | 28 | 32 | 1.0488 | 3.3194 | 28 | 32 | 1.0488 | 3.3194 | 28 | 32 | 1.0488 | 3.3194 | 28 | 32 | 1.0488 | 3.3194 | 28 |
| 33 | 1.0380 | 3.7302 | 27 | 33 | 1.0432 | 3.5106 | 27 | 33 | 1.0489 | 3.3163 | 27 | 33 | 1.0489 | 3.3163 | 27 | 33 | 1.0489 | 3.3163 | 27 | 33 | 1.0489 | 3.3163 | 27 |
| 34 | 1.0381 | 3.7263 | 26 | 34 | 1.0433 | 3.5072 | 26 | 34 | 1.0490 | 3.3133 | 26 | 34 | 1.0490 | 3.3133 | 26 | 34 | 1.0490 | 3.3133 | 26 | 34 | 1.0490 | 3.3133 | 26 |
| 35 | 1.0382 | 3.7225 | 25 | 35 | 1.0434 | 3.5037 | 25 | 35 | 1.0491 | 3.3102 | 25 | 35 | 1.0491 | 3.3102 | 25 | 35 | 1.0491 | 3.3102 | 25 | 35 | 1.0491 | 3.3102 | 25 |
| 36 | 1.0382 | 3.7186 | 24 | 36 | 1.0435 | 3.5003 | 24 | 36 | 1.0492 | 3.3072 | 24 | 36 | 1.0492 | 3.3072 | 24 | 36 | 1.0492 | 3.3072 | 24 | 36 | 1.0492 | 3.3072 | 24 |
| 37 | 1.0383 | 3.7147 | 23 | 37 | 1.0436 | 3.4969 | 23 | 37 | 1.0493 | 3.3042 | 23 | 37 | 1.0493 | 3.3042 | 23 | 37 | 1.0493 | 3.3042 | 23 | 37 | 1.0493 | 3.3042 | 23 |
| 38 | 1.0384 | 3.7108 | 22 | 38 | 1.0437 | 3.4935 | 22 | 38 | 1.0494 | 3.3012 | 22 | 38 | 1.0494 | 3.3012 | 22 | 38 | 1.0494 | 3.3012 | 22 | 38 | 1.0494 | 3.3012 | 22 |
| 39 | 1.0385 | 3.7070 | 21 | 39 | 1.0438 | 3.4901 | 21 | 39 | 1.0495 | 3.2981 | 21 | 39 | 1.0495 | 3.2981 | 21 | 39 | 1.0495 | 3.2981 | 21 | 39 | 1.0495 | 3.2981 | 21 |
| 40 | 1.0386 | 3.7032 | 20 | 40 | 1.0439 | 3.4867 | 20 | 40 | 1.0496 | 3.2951 | 20 | 40 | 1.0496 | 3.2951 | 20 | 40 | 1.0496 | 3.2951 | 20 | 40 | 1.0496 | 3.2951 | 20 |
| 41 | 1.0387 | 3.6993 | 19 | 41 | 1.0439 | 3.4833 | 19 | 41 | 1.0497 | 3.2921 | 19 | 41 | 1.0497 | 3.2921 | 19 | 41 | 1.0497 | 3.2921 | 19 | 41 | 1.0497 | 3.2921 | 19 |
| 42 | 1.0388 | 3.6955 | 18 | 42 | 1.0440 | 3.4799 | 18 | 42 | 1.0497 | 3.2891 | 18 | 42 | 1.0497 | 3.2891 | 18 | 42 | 1.0497 | 3.2891 | 18 | 42 | 1.0497 | 3.2891 | 18 |
| 43 | 1.0388 | 3.6917 | 17 | 43 | 1.0441 | 3.4766 | 17 | 43 | 1.0498 | 3.2861 | 17 | 43 | 1.0498 | 3.2861 | 17 | 43 | 1.0498 | 3.2861 | 17 | 43 | 1.0498 | 3.2861 | 17 |
| 44 | 1.0389 | 3.6879 | 16 | 44 | 1.0442 | 3.4732 | 16 | 44 | 1.0499 | 3.2831 | 16 | 44 | 1.0499 | 3.2831 | 16 | 44 | 1.0499 | 3.2831 | 16 | 44 | 1.0499 | 3.2831 | 16 |
| 45 | 1.0390 | 3.6840 | 15 | 45 | 1.0443 | 3.4699 | 15 | 45 | 1.0500 | 3.2801 | 15 | 45 | 1.0500 | 3.2801 | 15 | 45 | 1.0500 | 3.2801 | 15 | 45 | 1.0500 | 3.2801 | 15 |
| 46 | 1.0391 | 3.6803 | 14 | 46 | 1.0444 | 3.4665 | 14 | 46 | 1.0501 | 3.2772 | 14 | 46 | 1.0501 | 3.2772 | 14 | 46 | 1.0501 | 3.2772 | 14 | 46 | 1.0501 | 3.2772 | 14 |
| 47 | 1.0392 | 3.6765 | 13 | 47 | 1.0445 | 3.4632 | 13 | 47 | 1.0502 | 3.2742 | 13 | 47 | 1.0502 | 3.2742 | 13 | 47 | 1.0502 | 3.2742 | 13 | 47 | 1.0502 | 3.2742 | 13 |
| 48 | 1.0393 | 3.6727 | 12 | 48 | 1.0446 | 3.4598 | 12 | 48 | 1.0503 | 3.2712 | 12 | 48 | 1.0503 | 3.2712 | 12 | 48 | 1.0503 | 3.2712 | 12 | 48 | 1.0503 | 3.2712 | 12 |
| 49 | 1.0394 | 3.6689 | 11 | 49 | 1.0447 | 3.4565 | 11 | 49 | 1.0504 | 3.2683 | 11 | 49 | 1.0504 | 3.2683 | 11 | 49 | 1.0504 | 3.2683 | 11 | 49 | 1.0504 | 3.2683 | 11 |
| 50 | 1.0394 | 3.6652 | 10 | 50 | 1.0448 | 3.4532 | 10 | 50 | 1.0505 | 3.2653 | 10 | 50 | 1.0505 | 3.2653 | 10 | 50 | 1.0505 | 3.2653 | 10 | 50 | 1.0505 | 3.2653 | 10 |
| 51 | 1.0395 | 3.6614 | 9 | 51 | 1.0449 | 3.4499 | 9 | 51 | 1.0506 | 3.2624 | 9 | 51 | 1.0506 | 3.2624 | 9 | 51 | 1.0506 | 3.2624 | 9 | 51 | 1.0506 | 3.2624 | 9 |
| 52 | 1.0396 | 3.6576 | 8 | 52 | 1.0450 | 3.4465 | 8 | 52 | 1.0507 | 3.2594 | 8 | 52 | 1.0507 | 3.2594 | 8 | 52 | 1.0507 | 3.2594 | 8 | 52 | 1.0507 | 3.2594 | 8 |
| 53 | 1.0397 | 3.6539 | 7 | 53 | 1.0450 | 3.4432 | 7 | 53 | 1.0508 | 3.2565 | 7 | 53 | 1.0508 | 3.2565 | 7 | 53 | 1.0508 | 3.2565 | 7 | 53 | 1.0508 | 3.2565 | 7 |
| 54 | | | | | | | | | | | | | | | | | | | | | | | |

NATURAL FUNCTIONS—SECANTS AND COSECANTS (Continued)

18° (198°)

(341°) 161°

19° (199°)

(340°) 160°

20° (200°)

(339°) 159°

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.0515 | 3.2361 | 60 |
| 1 | 1.0516 | 3.2332 | 59 |
| 2 | 1.0517 | 3.2303 | 58 |
| 3 | 1.0518 | 3.2274 | 57 |
| 4 | 1.0519 | 3.2245 | 56 |
| 5 | 1.0520 | 3.2217 | 55 |
| 6 | 1.0521 | 3.2188 | 54 |
| 7 | 1.0522 | 3.2159 | 53 |
| 8 | 1.0523 | 3.2131 | 52 |
| 9 | 1.0524 | 3.2102 | 51 |
| 10 | 1.0525 | 3.2074 | 50 |
| 11 | 1.0526 | 3.2045 | 49 |
| 12 | 1.0527 | 3.2017 | 48 |
| 13 | 1.0528 | 3.1989 | 47 |
| 14 | 1.0529 | 3.1960 | 46 |
| 15 | 1.0530 | 3.1932 | 45 |
| 16 | 1.0531 | 3.1904 | 44 |
| 17 | 1.0532 | 3.1876 | 43 |
| 18 | 1.0533 | 3.1848 | 42 |
| 19 | 1.0534 | 3.1820 | 41 |
| 20 | 1.0535 | 3.1792 | 40 |
| 21 | 1.0536 | 3.1764 | 39 |
| 22 | 1.0537 | 3.1736 | 38 |
| 23 | 1.0538 | 3.1708 | 37 |
| 24 | 1.0539 | 3.1681 | 36 |
| 25 | 1.0540 | 3.1653 | 35 |
| 26 | 1.0541 | 3.1625 | 34 |
| 27 | 1.0542 | 3.1598 | 33 |
| 28 | 1.0543 | 3.1570 | 32 |
| 29 | 1.0544 | 3.1543 | 31 |
| 30 | 1.0545 | 3.1515 | 30 |
| 31 | 1.0546 | 3.1488 | 29 |
| 32 | 1.0547 | 3.1461 | 28 |
| 33 | 1.0548 | 3.1433 | 27 |
| 34 | 1.0549 | 3.1406 | 26 |
| 35 | 1.0550 | 3.1379 | 25 |
| 36 | 1.0551 | 3.1352 | 24 |
| 37 | 1.0552 | 3.1325 | 23 |
| 38 | 1.0553 | 3.1298 | 22 |
| 39 | 1.0554 | 3.1271 | 21 |
| 40 | 1.0555 | 3.1244 | 20 |
| 41 | 1.0556 | 3.1217 | 19 |
| 42 | 1.0557 | 3.1190 | 18 |
| 43 | 1.0558 | 3.1163 | 17 |
| 44 | 1.0559 | 3.1137 | 16 |
| 45 | 1.0560 | 3.1110 | 15 |
| 46 | 1.0561 | 3.1083 | 14 |
| 47 | 1.0563 | 3.1057 | 13 |
| 48 | 1.0564 | 3.1030 | 12 |
| 49 | 1.0565 | 3.1004 | 11 |
| 50 | 1.0566 | 3.0977 | 10 |
| 51 | 1.0567 | 3.0951 | 9 |
| 52 | 1.0568 | 3.0925 | 8 |
| 53 | 1.0569 | 3.0898 | 7 |
| 54 | 1.0570 | 3.0872 | 6 |
| 55 | 1.0571 | 3.0846 | 5 |
| 56 | 1.0572 | 3.0820 | 4 |
| 57 | 1.0573 | 3.0794 | 3 |
| 58 | 1.0574 | 3.0768 | 2 |
| 59 | 1.0575 | 3.0742 | 1 |
| 60 | 1.0576 | 3.0716 | 0 |
| ' | Csc | Sec | ' |

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.0576 | 3.0716 | 60 |
| 1 | 1.0577 | 3.0690 | 59 |
| 2 | 1.0578 | 3.0664 | 58 |
| 3 | 1.0579 | 3.0638 | 57 |
| 4 | 1.0580 | 3.0612 | 56 |
| 5 | 1.0582 | 3.0586 | 55 |
| 6 | 1.0583 | 3.0561 | 54 |
| 7 | 1.0584 | 3.0535 | 53 |
| 8 | 1.0585 | 3.0509 | 52 |
| 9 | 1.0586 | 3.0484 | 51 |
| 10 | 1.0587 | 3.0458 | 50 |
| 11 | 1.0588 | 3.0433 | 49 |
| 12 | 1.0589 | 3.0407 | 48 |
| 13 | 1.0590 | 3.0382 | 47 |
| 14 | 1.0591 | 3.0357 | 46 |
| 15 | 1.0592 | 3.0331 | 45 |
| 16 | 1.0593 | 3.0306 | 44 |
| 17 | 1.0594 | 3.0281 | 43 |
| 18 | 1.0595 | 3.0256 | 42 |
| 19 | 1.0597 | 3.0231 | 41 |
| 20 | 1.0598 | 3.0206 | 40 |
| 21 | 1.0599 | 3.0181 | 39 |
| 22 | 1.0600 | 3.0156 | 38 |
| 23 | 1.0601 | 3.0131 | 37 |
| 24 | 1.0602 | 3.0106 | 36 |
| 25 | 1.0603 | 3.0081 | 35 |
| 26 | 1.0604 | 3.0056 | 34 |
| 27 | 1.0605 | 3.0031 | 33 |
| 28 | 1.0606 | 3.0007 | 32 |
| 29 | 1.0607 | 2.9982 | 31 |
| 30 | 1.0608 | 2.9957 | 30 |
| 31 | 1.0610 | 2.9933 | 29 |
| 32 | 1.0611 | 2.9908 | 28 |
| 33 | 1.0612 | 2.9884 | 27 |
| 34 | 1.0613 | 2.9859 | 26 |
| 35 | 1.0614 | 2.9835 | 25 |
| 36 | 1.0615 | 2.9811 | 24 |
| 37 | 1.0616 | 2.9786 | 23 |
| 38 | 1.0617 | 2.9762 | 22 |
| 39 | 1.0618 | 2.9738 | 21 |
| 40 | 1.0619 | 2.9713 | 20 |
| 41 | 1.0621 | 2.9689 | 19 |
| 42 | 1.0622 | 2.9665 | 18 |
| 43 | 1.0623 | 2.9641 | 17 |
| 44 | 1.0624 | 2.9617 | 16 |
| 45 | 1.0625 | 2.9593 | 15 |
| 46 | 1.0626 | 2.9569 | 14 |
| 47 | 1.0627 | 2.9545 | 13 |
| 48 | 1.0628 | 2.9521 | 12 |
| 49 | 1.0629 | 2.9498 | 11 |
| 50 | 1.0631 | 2.9474 | 10 |
| 51 | 1.0632 | 2.9450 | 9 |
| 52 | 1.0633 | 2.9426 | 8 |
| 53 | 1.0634 | 2.9403 | 7 |
| 54 | 1.0635 | 2.9379 | 6 |
| 55 | 1.0636 | 2.9355 | 5 |
| 56 | 1.0637 | 2.9332 | 4 |
| 57 | 1.0638 | 2.9308 | 3 |
| 58 | 1.0640 | 2.9285 | 2 |
| 59 | 1.0641 | 2.9261 | 1 |
| 60 | 1.0642 | 2.9238 | 0 |
| ' | Csc | Sec | ' |

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.0642 | 2.9238 | 60 |
| 1 | 1.0643 | 2.9215 | 59 |
| 2 | 1.0644 | 2.9191 | 58 |
| 3 | 1.0645 | 2.9168 | 57 |
| 4 | 1.0646 | 2.9145 | 56 |
| 5 | 1.0647 | 2.9122 | 55 |
| 6 | 1.0649 | 2.9099 | 54 |
| 7 | 1.0650 | 2.9075 | 53 |
| 8 | 1.0651 | 2.9052 | 52 |
| 9 | 1.0652 | 2.9029 | 51 |
| 10 | 1.0653 | 2.9006 | 50 |
| 11 | 1.0654 | 2.8983 | 49 |
| 12 | 1.0655 | 2.8960 | 48 |
| 13 | 1.0657 | 2.8938 | 47 |
| 14 | 1.0658 | 2.8915 | 46 |
| 15 | 1.0659 | 2.8892 | 45 |
| 16 | 1.0660 | 2.8869 | 44 |
| 17 | 1.0661 | 2.8846 | 43 |
| 18 | 1.0662 | 2.8824 | 42 |
| 19 | 1.0663 | 2.8801 | 41 |
| 20 | 1.0665 | 2.8779 | 40 |
| 21 | 1.0666 | 2.8756 | 39 |
| 22 | 1.0667 | 2.8733 | 38 |
| 23 | 1.0668 | 2.8711 | 37 |
| 24 | 1.0669 | 2.8688 | 36 |
| 25 | 1.0670 | 2.8666 | 35 |
| 26 | 1.0671 | 2.8644 | 34 |
| 27 | 1.0673 | 2.8621 | 33 |
| 28 | 1.0674 | 2.8599 | 32 |
| 29 | 1.0675 | 2.8577 | 31 |
| 30 | 1.0676 | 2.8555 | 30 |
| 31 | 1.0677 | 2.8532 | 29 |
| 32 | 1.0678 | 2.8510 | 28 |
| 33 | 1.0680 | 2.8488 | 27 |
| 34 | 1.0681 | 2.8466 | 26 |
| 35 | 1.0682 | 2.8444 | 25 |
| 36 | 1.0683 | 2.8422 | 24 |
| 37 | 1.0684 | 2.8400 | 23 |
| 38 | 1.0685 | 2.8378 | 22 |
| 39 | 1.0687 | 2.8356 | 21 |
| 40 | 1.0688 | 2.8334 | 20 |
| 41 | 1.0689 | 2.8312 | 19 |
| 42 | 1.0690 | 2.8291 | 18 |
| 43 | 1.0691 | 2.8269 | 17 |
| 44 | 1.0692 | 2.8247 | 16 |
| 45 | 1.0694 | 2.8225 | 15 |
| 46 | 1.0695 | 2.8204 | 14 |
| 47 | 1.0696 | 2.8182 | 13 |
| 48 | 1.0697 | 2.8161 | 12 |
| 49 | 1.0698 | 2.8139 | 11 |
| 50 | 1.0700 | 2.8117 | 10 |
| 51 | 1.0701 | 2.8096 | 9 |
| 52 | 1.0702 | 2.8075 | 8 |
| 53 | 1.0703 | 2.8053 | 7 |
| 54 | 1.0704 | 2.8032 | 6 |
| 55 | 1.0705 | 2.8010 | 5 |
| 56 | 1.0707 | 2.7989 | 4 |
| 57 | 1.0708 | 2.7968 | 3 |
| 58 | 1.0709 | 2.7947 | 2 |
| 59 | 1.0710 | 2.7925 | 1 |
| 60 | 1.0711 | 2.7904 | 0 |
| ' | Csc | Sec | ' |

108° (288°)

(251°) 71°

109° (289°)

(250°) 70°

110° (290°)

(249°) 69°

NATURAL FUNCTIONS—SECANTS AND COSECANTS (Continued)

21° (201°)

(338°) 158°

22° (202°)

(337°) 157°

23° (203°)

(336°) 156°

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.0711 | 2.7904 | 60 |
| 1 | 1.0713 | 2.7883 | 59 |
| 2 | 1.0714 | 2.7862 | 58 |
| 3 | 1.0715 | 2.7841 | 57 |
| 4 | 1.0716 | 2.7820 | 56 |
| 5 | 1.0717 | 2.7799 | 55 |
| 6 | 1.0719 | 2.7778 | 54 |
| 7 | 1.0720 | 2.7757 | 53 |
| 8 | 1.0721 | 2.7736 | 52 |
| 9 | 1.0722 | 2.7715 | 51 |
| 10 | 1.0723 | 2.7695 | 50 |
| 11 | 1.0725 | 2.7674 | 49 |
| 12 | 1.0726 | 2.7653 | 48 |
| 13 | 1.0727 | 2.7632 | 47 |
| 14 | 1.0728 | 2.7612 | 46 |
| 15 | 1.0730 | 2.7591 | 45 |
| 16 | 1.0731 | 2.7570 | 44 |
| 17 | 1.0732 | 2.7550 | 43 |
| 18 | 1.0733 | 2.7529 | 42 |
| 19 | 1.0734 | 2.7509 | 41 |
| 20 | 1.0736 | 2.7488 | 40 |
| 21 | 1.0737 | 2.7468 | 39 |
| 22 | 1.0738 | 2.7447 | 38 |
| 23 | 1.0739 | 2.7427 | 37 |
| 24 | 1.0740 | 2.7407 | 36 |
| 25 | 1.0742 | 2.7386 | 35 |
| 26 | 1.0743 | 2.7366 | 34 |
| 27 | 1.0744 | 2.7346 | 33 |
| 28 | 1.0745 | 2.7325 | 32 |
| 29 | 1.0747 | 2.7305 | 31 |
| 30 | 1.0748 | 2.7285 | 30 |
| 31 | 1.0749 | 2.7265 | 29 |
| 32 | 1.0750 | 2.7245 | 28 |
| 33 | 1.0752 | 2.7225 | 27 |
| 34 | 1.0753 | 2.7205 | 26 |
| 35 | 1.0754 | 2.7185 | 25 |
| 36 | 1.0755 | 2.7165 | 24 |
| 37 | 1.0757 | 2.7145 | 23 |
| 38 | 1.0758 | 2.7125 | 22 |
| 39 | 1.0759 | 2.7105 | 21 |
| 40 | 1.0760 | 2.7085 | 20 |
| 41 | 1.0761 | 2.7065 | 19 |
| 42 | 1.0763 | 2.7046 | 18 |
| 43 | 1.0764 | 2.7026 | 17 |
| 44 | 1.0765 | 2.7006 | 16 |
| 45 | 1.0766 | 2.6986 | 15 |
| 46 | 1.0768 | 2.6967 | 14 |
| 47 | 1.0769 | 2.6947 | 13 |
| 48 | 1.0770 | 2.6927 | 12 |
| 49 | 1.0771 | 2.6908 | 11 |
| 50 | 1.0773 | 2.6888 | 10 |
| 51 | 1.0774 | 2.6869 | 9 |
| 52 | 1.0775 | 2.6849 | 8 |
| 53 | 1.0777 | 2.6830 | 7 |
| 54 | 1.0778 | 2.6811 | 6 |
| 55 | 1.0779 | 2.6791 | 5 |
| 56 | 1.0780 | 2.6772 | 4 |
| 57 | 1.0782 | 2.6752 | 3 |
| 58 | 1.0783 | 2.6733 | 2 |
| 59 | 1.0784 | 2.6714 | 1 |
| 60 | 1.0785 | 2.6695 | 0 |
| ' | Csc | Sec | ' |

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.0785 | 2.6695 | 60 |
| 1 | 1.0787 | 2.6675 | 59 |
| 2 | 1.0788 | 2.6656 | 58 |
| 3 | 1.0789 | 2.6637 | 57 |
| 4 | 1.0790 | 2.6618 | 56 |
| 5 | 1.0792 | 2.6599 | 55 |
| 6 | 1.0793 | 2.6580 | 54 |
| 7 | 1.0794 | 2.6561 | 53 |
| 8 | 1.0796 | 2.6542 | 52 |
| 9 | 1.0797 | 2.6523 | 51 |
| 10 | 1.0798 | 2.6504 | 50 |
| 11 | 1.0799 | 2.6485 | 49 |
| 12 | 1.0801 | 2.6466 | 48 |
| 13 | 1.0802 | 2.6447 | 47 |
| 14 | 1.0803 | 2.6429 | 46 |
| 15 | 1.0804 | 2.6410 | 45 |
| 16 | 1.0806 | 2.6391 | 44 |
| 17 | 1.0807 | 2.6372 | 43 |
| 18 | 1.0808 | 2.6354 | 42 |
| 19 | 1.0810 | 2.6335 | 41 |
| 20 | 1.0811 | 2.6316 | 40 |
| 21 | 1.0812 | 2.6298 | 39 |
| 22 | 1.0814 | 2.6279 | 38 |
| 23 | 1.0815 | 2.6260 | 37 |
| 24 | 1.0816 | 2.6242 | 36 |
| 25 | 1.0817 | 2.6223 | 35 |
| 26 | 1.0819 | 2.6205 | 34 |
| 27 | 1.0820 | 2.6186 | 33 |
| 28 | 1.0821 | 2.6168 | 32 |
| 29 | 1.0823 | 2.6150 | 31 |
| 30 | 1.0824 | 2.6131 | 30 |
| 31 | 1.0825 | 2.6113 | 29 |
| 32 | 1.0827 | 2.6095 | 28 |
| 33 | 1.0828 | 2.6076 | 27 |
| 34 | 1.0829 | 2.6058 | 26 |
| 35 | 1.0830 | 2.6040 | 25 |
| 36 | 1.0832 | 2.6022 | 24 |
| 37 | 1.0833 | 2.6003 | 23 |
| 38 | 1.0834 | 2.5985 | 22 |
| 39 | 1.0836 | 2.5967 | 21 |
| 40 | 1.0837 | 2.5949 | 20 |
| 41 | 1.0838 | 2.5931 | 19 |
| 42 | 1.0840 | 2.5913 | 18 |
| 43 | 1.0841 | 2.5895 | 17 |
| 44 | 1.0842 | 2.5877 | 16 |
| 45 | 1.0844 | 2.5859 | 15 |
| 46 | 1.0845 | 2.5841 | 14 |
| 47 | 1.0846 | 2.5823 | 13 |
| 48 | 1.0848 | 2.5805 | 12 |
| 49 | 1.0849 | 2.5788 | 11 |
| 50 | 1.0850 | 2.5770 | 10 |
| 51 | 1.0852 | 2.5752 | 9 |
| 52 | 1.0853 | 2.5734 | 8 |
| 53 | 1.0854 | 2.5716 | 7 |
| 54 | 1.0856 | 2.5699 | 6 |
| 55 | 1.0857 | 2.5681 | 5 |
| 56 | 1.0858 | 2.5663 | 4 |
| 57 | 1.0860 | 2.5646 | 3 |
| 58 | 1.0861 | 2.5628 | 2 |
| 59 | 1.0862 | 2.5611 | 1 |
| 60 | 1.0864 | 2.5593 | 0 |
| ' | Csc | Sec | ' |

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.0864 | 2.5593 | 60 |
| 1 | 1.0865 | 2.5576 | 59 |
| 2 | 1.0866 | 2.5558 | 58 |
| 3 | 1.0868 | 2.5541 | 57 |
| 4 | 1.0869 | 2.5523 | 56 |
| 5 | 1.0870 | 2.5506 | 55 |
| 6 | 1.0872 | 2.5488 | 54 |
| 7 | 1.0873 | 2.5471 | 53 |
| 8 | 1.0874 | 2.5454 | 52 |
| 9 | 1.0876 | 2.5436 | 51 |
| 10 | 1.0877 | 2.5419 | 50 |
| 11 | 1.0878 | 2.5402 | 49 |
| 12 | 1.0880 | 2.5384 | 48 |
| 13 | 1.0881 | 2.5367 | 47 |
| 14 | 1.0883 | 2.5350 | 46 |
| 15 | 1.0884 | 2.5333 | 45 |
| 16 | 1.0885 | 2.5316 | 44 |
| 17 | 1.0887 | 2.5299 | 43 |
| 18 | 1.0888 | 2.5282 | 42 |
| 19 | 1.0889 | 2.5264 | 41 |
| 20 | 1.0891 | 2.5247 | 40 |
| 21 | 1.0892 | 2.5230 | 39 |
| 22 | 1.0893 | 2.5213 | 38 |
| 23 | 1.0895 | 2.5196 | 37 |
| 24 | 1.0896 | 2.5180 | 36 |
| 25 | 1.0898 | 2.5163 | 35 |
| 26 | 1.0899 | 2.5146 | 34 |
| 27 | 1.0900 | 2.5129 | 33 |
| 28 | 1.0902 | 2.5112 | 32 |
| 29 | 1.0903 | 2.5095 | 31 |
| 30 | 1.0904 | 2.5078 | 30 |
| 31 | 1.0906 | 2.5062 | 29 |
| 32 | 1.0907 | 2.5045 | 28 |
| 33 | 1.0909 | 2.5028 | 27 |
| 34 | 1.0910 | 2.5012 | 26 |
| 35 | 1.0911 | 2.4995 | 25 |
| 36 | 1.0913 | 2.4978 | 24 |
| 37 | 1.0914 | 2.4962 | 23 |
| 38 | 1.0915 | 2.4945 | 22 |
| 39 | 1.0917 | 2.4928 | 21 |
| 40 | 1.0918 | 2.4912 | 20 |
| 41 | 1.0920 | 2.4895 | 19 |
| 42 | 1.0921 | 2.4879 | 18 |
| 43 | 1.0922 | 2.4862 | 17 |
| 44 | 1.0924 | 2.4846 | 16 |
| 45 | 1.0925 | 2.4830 | 15 |
| 46 | 1.0927 | 2.4813 | 14 |
| 47 | 1.0928 | 2.4797 | 13 |
| 48 | 1.0929 | 2.4780 | 12 |
| 49 | 1.0931 | 2.4764 | 11 |
| 50 | 1.0932 | 2.4748 | 10 |
| 51 | 1.0934 | 2.4731 | 9 |
| 52 | 1.0935 | 2.4715 | 8 |
| 53 | 1.0936 | 2.4699 | 7 |
| 54 | 1.0938 | 2.4683 | 6 |
| 55 | 1.0939 | 2.4667 | 5 |
| 56 | 1.0941 | 2.4650 | 4 |
| 57 | 1.0942 | 2.4634 | 3 |
| 58 | 1.0944 | 2.4618 | 2 |
| 59 | 1.0945 | 2.4602 | 1 |
| 60 | 1.0946 | 2.4586 | 0 |
| ' | Csc | Sec | ' |

111° (291°)

(248°) 68°

112° (292°)

(247°) 67°

113° (293°)

(246°) 66°

NATURAL FUNCTIONS—SECANTS AND COSECANTS (Continued)

24° (204°) (335°) 155° 25° (205°) (334°) 154° 26° (206°) (333°) 153°

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.0946 | 2.4586 | 60 |
| 1 | 1.0948 | 2.4570 | 59 |
| 2 | 1.0949 | 2.4554 | 58 |
| 3 | 1.0951 | 2.4538 | 57 |
| 4 | 1.0952 | 2.4522 | 56 |
| 5 | 1.0953 | 2.4506 | 55 |
| 6 | 1.0955 | 2.4490 | 54 |
| 7 | 1.0956 | 2.4474 | 53 |
| 8 | 1.0958 | 2.4458 | 52 |
| 9 | 1.0959 | 2.4442 | 51 |
| 10 | 1.0961 | 2.4426 | 50 |
| 11 | 1.0962 | 2.4411 | 49 |
| 12 | 1.0963 | 2.4395 | 48 |
| 13 | 1.0965 | 2.4379 | 47 |
| 14 | 1.0966 | 2.4363 | 46 |
| 15 | 1.0968 | 2.4348 | 45 |
| 16 | 1.0969 | 2.4332 | 44 |
| 17 | 1.0971 | 2.4316 | 43 |
| 18 | 1.0972 | 2.4300 | 42 |
| 19 | 1.0974 | 2.4285 | 41 |
| 20 | 1.0975 | 2.4269 | 40 |
| 21 | 1.0976 | 2.4254 | 39 |
| 22 | 1.0978 | 2.4238 | 38 |
| 23 | 1.0979 | 2.4222 | 37 |
| 24 | 1.0981 | 2.4207 | 36 |
| 25 | 1.0982 | 2.4191 | 35 |
| 26 | 1.0984 | 2.4176 | 34 |
| 27 | 1.0985 | 2.4160 | 33 |
| 28 | 1.0987 | 2.4145 | 32 |
| 29 | 1.0988 | 2.4130 | 31 |
| 30 | 1.0989 | 2.4114 | 30 |
| 31 | 1.0991 | 2.4099 | 29 |
| 32 | 1.0992 | 2.4083 | 28 |
| 33 | 1.0994 | 2.4068 | 27 |
| 34 | 1.0995 | 2.4053 | 26 |
| 35 | 1.0997 | 2.4038 | 25 |
| 36 | 1.0998 | 2.4022 | 24 |
| 37 | 1.1000 | 2.4007 | 23 |
| 38 | 1.1001 | 2.3992 | 22 |
| 39 | 1.1003 | 2.3977 | 21 |
| 40 | 1.1004 | 2.3961 | 20 |
| 41 | 1.1006 | 2.3946 | 19 |
| 42 | 1.1007 | 2.3931 | 18 |
| 43 | 1.1009 | 2.3916 | 17 |
| 44 | 1.1010 | 2.3901 | 16 |
| 45 | 1.1011 | 2.3886 | 15 |
| 46 | 1.1013 | 2.3871 | 14 |
| 47 | 1.1014 | 2.3856 | 13 |
| 48 | 1.1016 | 2.3841 | 12 |
| 49 | 1.1017 | 2.3826 | 11 |
| 50 | 1.1019 | 2.3811 | 10 |
| 51 | 1.1020 | 2.3796 | 9 |
| 52 | 1.1022 | 2.3781 | 8 |
| 53 | 1.1023 | 2.3766 | 7 |
| 54 | 1.1025 | 2.3751 | 6 |
| 55 | 1.1026 | 2.3736 | 5 |
| 56 | 1.1028 | 2.3721 | 4 |
| 57 | 1.1029 | 2.3706 | 3 |
| 58 | 1.1031 | 2.3692 | 2 |
| 59 | 1.1032 | 2.3677 | 1 |
| 60 | 1.1034 | 2.3662 | 0 |
| ' | Csc | Sec | ' |

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.1034 | 2.3662 | 60 |
| 1 | 1.1035 | 2.3647 | 59 |
| 2 | 1.1037 | 2.3633 | 58 |
| 3 | 1.1038 | 2.3618 | 57 |
| 4 | 1.1040 | 2.3603 | 56 |
| 5 | 1.1041 | 2.3588 | 55 |
| 6 | 1.1043 | 2.3574 | 54 |
| 7 | 1.1044 | 2.3559 | 53 |
| 8 | 1.1046 | 2.3545 | 52 |
| 9 | 1.1047 | 2.3530 | 51 |
| 10 | 1.1049 | 2.3515 | 50 |
| 11 | 1.1050 | 2.3501 | 49 |
| 12 | 1.1052 | 2.3486 | 48 |
| 13 | 1.1053 | 2.3472 | 47 |
| 14 | 1.1055 | 2.3457 | 46 |
| 15 | 1.1056 | 2.3443 | 45 |
| 16 | 1.1058 | 2.3428 | 44 |
| 17 | 1.1059 | 2.3414 | 43 |
| 18 | 1.1061 | 2.3400 | 42 |
| 19 | 1.1062 | 2.3385 | 41 |
| 20 | 1.1064 | 2.3371 | 40 |
| 21 | 1.1066 | 2.3356 | 39 |
| 22 | 1.1067 | 2.3342 | 38 |
| 23 | 1.1069 | 2.3328 | 37 |
| 24 | 1.1070 | 2.3314 | 36 |
| 25 | 1.1072 | 2.3299 | 35 |
| 26 | 1.1073 | 2.3285 | 34 |
| 27 | 1.1075 | 2.3271 | 33 |
| 28 | 1.1076 | 2.3257 | 32 |
| 29 | 1.1078 | 2.3242 | 31 |
| 30 | 1.1079 | 2.3228 | 30 |
| 31 | 1.1081 | 2.3214 | 29 |
| 32 | 1.1082 | 2.3200 | 28 |
| 33 | 1.1084 | 2.3186 | 27 |
| 34 | 1.1085 | 2.3172 | 26 |
| 35 | 1.1087 | 2.3158 | 25 |
| 36 | 1.1089 | 2.3144 | 24 |
| 37 | 1.1090 | 2.3130 | 23 |
| 38 | 1.1092 | 2.3115 | 22 |
| 39 | 1.1093 | 2.3101 | 21 |
| 40 | 1.1095 | 2.3088 | 20 |
| 41 | 1.1096 | 2.3074 | 19 |
| 42 | 1.1098 | 2.3060 | 18 |
| 43 | 1.1099 | 2.3046 | 17 |
| 44 | 1.1101 | 2.3032 | 16 |
| 45 | 1.1102 | 2.3018 | 15 |
| 46 | 1.1104 | 2.3004 | 14 |
| 47 | 1.1106 | 2.2990 | 13 |
| 48 | 1.1107 | 2.2976 | 12 |
| 49 | 1.1109 | 2.2962 | 11 |
| 50 | 1.1110 | 2.2949 | 10 |
| 51 | 1.1112 | 2.2935 | 9 |
| 52 | 1.1113 | 2.2921 | 8 |
| 53 | 1.1115 | 2.2907 | 7 |
| 54 | 1.1117 | 2.2894 | 6 |
| 55 | 1.1118 | 2.2880 | 5 |
| 56 | 1.1120 | 2.2866 | 4 |
| 57 | 1.1121 | 2.2853 | 3 |
| 58 | 1.1123 | 2.2839 | 2 |
| 59 | 1.1124 | 2.2825 | 1 |
| 60 | 1.1126 | 2.2812 | 0 |
| ' | Csc | Sec | ' |

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.1126 | 2.2812 | 60 |
| 1 | 1.1128 | 2.2798 | 59 |
| 2 | 1.1129 | 2.2785 | 58 |
| 3 | 1.1131 | 2.2771 | 57 |
| 4 | 1.1132 | 2.2757 | 56 |
| 5 | 1.1134 | 2.2744 | 55 |
| 6 | 1.1136 | 2.2730 | 54 |
| 7 | 1.1137 | 2.2717 | 53 |
| 8 | 1.1139 | 2.2703 | 52 |
| 9 | 1.1140 | 2.2690 | 51 |
| 10 | 1.1142 | 2.2677 | 50 |
| 11 | 1.1143 | 2.2663 | 49 |
| 12 | 1.1145 | 2.2650 | 48 |
| 13 | 1.1147 | 2.2636 | 47 |
| 14 | 1.1148 | 2.2623 | 46 |
| 15 | 1.1150 | 2.2610 | 45 |
| 16 | 1.1151 | 2.2596 | 44 |
| 17 | 1.1153 | 2.2583 | 43 |
| 18 | 1.1155 | 2.2570 | 42 |
| 19 | 1.1156 | 2.2556 | 41 |
| 20 | 1.1158 | 2.2543 | 40 |
| 21 | 1.1159 | 2.2530 | 39 |
| 22 | 1.1161 | 2.2517 | 38 |
| 23 | 1.1163 | 2.2504 | 37 |
| 24 | 1.1164 | 2.2490 | 36 |
| 25 | 1.1166 | 2.2477 | 35 |
| 26 | 1.1168 | 2.2464 | 34 |
| 27 | 1.1169 | 2.2451 | 33 |
| 28 | 1.1171 | 2.2438 | 32 |
| 29 | 1.1172 | 2.2425 | 31 |
| 30 | 1.1174 | 2.2412 | 30 |
| 31 | 1.1176 | 2.2399 | 29 |
| 32 | 1.1177 | 2.2385 | 28 |
| 33 | 1.1179 | 2.2372 | 27 |
| 34 | 1.1180 | 2.2359 | 26 |
| 35 | 1.1182 | 2.2346 | 25 |
| 36 | 1.1184 | 2.2333 | 24 |
| 37 | 1.1185 | 2.2320 | 23 |
| 38 | 1.1187 | 2.2308 | 22 |
| 39 | 1.1189 | 2.2295 | 21 |
| 40 | 1.1190 | 2.2282 | 20 |
| 41 | 1.1192 | 2.2269 | 19 |
| 42 | 1.1194 | 2.2256 | 18 |
| 43 | 1.1195 | 2.2243 | 17 |
| 44 | 1.1197 | 2.2230 | 16 |
| 45 | 1.1198 | 2.2217 | 15 |
| 46 | 1.1200 | 2.2205 | 14 |
| 47 | 1.1202 | 2.2192 | 13 |
| 48 | 1.1203 | 2.2179 | 12 |
| 49 | 1.1205 | 2.2166 | 11 |
| 50 | 1.1207 | 2.2153 | 10 |
| 51 | 1.1208 | 2.2141 | 9 |
| 52 | 1.1210 | 2.2128 | 8 |
| 53 | 1.1212 | 2.2115 | 7 |
| 54 | 1.1213 | 2.2103 | 6 |
| 55 | 1.1215 | 2.2090 | 5 |
| 56 | 1.1217 | 2.2077 | 4 |
| 57 | 1.1218 | 2.2065 | 3 |
| 58 | 1.1220 | 2.2052 | 2 |
| 59 | 1.1222 | 2.2039 | 1 |
| 60 | 1.1223 | 2.2027 | 0 |
| ' | Csc | Sec | ' |

114° (294°) (245°) 65° 115° (295°) (244°) 64° 116° (296°) (243°) 63°

NATURAL FUNCTIONS—SECANTS AND COSECANTS (Continued)

| 27° (207°) | | | | (332°) 152° | | | | 28° (208°) | | | | (331°) 151° | | | | 29° (209°) | | | | (330°) 150° | | | |
|------------|--------|--------|----|-------------|--------|--------|----|------------|--------|--------|----|-------------|--------|--------|----|------------|--------|--------|----|-------------|--------|--------|----|
| ' | Sec | Csc | ' | ' | Sec | Csc | ' | ' | Sec | Csc | ' | ' | Sec | Csc | ' | ' | Sec | Csc | ' | ' | Sec | Csc | ' |
| 0 | 1.1223 | 2.2027 | 60 | 0 | 1.1326 | 2.1301 | 60 | 0 | 1.1434 | 2.0627 | 60 | 0 | 1.1434 | 2.0627 | 60 | 0 | 1.1434 | 2.0627 | 60 | 0 | 1.1434 | 2.0627 | 60 |
| 1 | 1.1225 | 2.2014 | 59 | 1 | 1.1327 | 2.1289 | 59 | 1 | 1.1435 | 2.0616 | 59 | 1 | 1.1435 | 2.0616 | 59 | 1 | 1.1435 | 2.0616 | 59 | 1 | 1.1435 | 2.0616 | 59 |
| 2 | 1.1227 | 2.2002 | 58 | 2 | 1.1329 | 2.1277 | 58 | 2 | 1.1437 | 2.0605 | 58 | 2 | 1.1437 | 2.0605 | 58 | 2 | 1.1437 | 2.0605 | 58 | 2 | 1.1437 | 2.0605 | 58 |
| 3 | 1.1228 | 2.1989 | 57 | 3 | 1.1331 | 2.1266 | 57 | 3 | 1.1439 | 2.0594 | 57 | 3 | 1.1439 | 2.0594 | 57 | 3 | 1.1439 | 2.0594 | 57 | 3 | 1.1439 | 2.0594 | 57 |
| 4 | 1.1230 | 2.1977 | 56 | 4 | 1.1333 | 2.1254 | 56 | 4 | 1.1441 | 2.0583 | 56 | 4 | 1.1441 | 2.0583 | 56 | 4 | 1.1441 | 2.0583 | 56 | 4 | 1.1441 | 2.0583 | 56 |
| 5 | 1.1232 | 2.1964 | 55 | 5 | 1.1334 | 2.1242 | 55 | 5 | 1.1443 | 2.0573 | 55 | 5 | 1.1443 | 2.0573 | 55 | 5 | 1.1443 | 2.0573 | 55 | 5 | 1.1443 | 2.0573 | 55 |
| 6 | 1.1233 | 2.1952 | 54 | 6 | 1.1336 | 2.1231 | 54 | 6 | 1.1445 | 2.0562 | 54 | 6 | 1.1445 | 2.0562 | 54 | 6 | 1.1445 | 2.0562 | 54 | 6 | 1.1445 | 2.0562 | 54 |
| 7 | 1.1235 | 2.1939 | 53 | 7 | 1.1338 | 2.1219 | 53 | 7 | 1.1446 | 2.0551 | 53 | 7 | 1.1446 | 2.0551 | 53 | 7 | 1.1446 | 2.0551 | 53 | 7 | 1.1446 | 2.0551 | 53 |
| 8 | 1.1237 | 2.1927 | 52 | 8 | 1.1340 | 2.1208 | 52 | 8 | 1.1448 | 2.0540 | 52 | 8 | 1.1448 | 2.0540 | 52 | 8 | 1.1448 | 2.0540 | 52 | 8 | 1.1448 | 2.0540 | 52 |
| 9 | 1.1238 | 2.1914 | 51 | 9 | 1.1342 | 2.1196 | 51 | 9 | 1.1450 | 2.0530 | 51 | 9 | 1.1450 | 2.0530 | 51 | 9 | 1.1450 | 2.0530 | 51 | 9 | 1.1450 | 2.0530 | 51 |
| 10 | 1.1240 | 2.1902 | 50 | 10 | 1.1343 | 2.1185 | 50 | 10 | 1.1452 | 2.0519 | 50 | 10 | 1.1452 | 2.0519 | 50 | 10 | 1.1452 | 2.0519 | 50 | 10 | 1.1452 | 2.0519 | 50 |
| 11 | 1.1242 | 2.1890 | 49 | 11 | 1.1345 | 2.1173 | 49 | 11 | 1.1454 | 2.0508 | 49 | 11 | 1.1454 | 2.0508 | 49 | 11 | 1.1454 | 2.0508 | 49 | 11 | 1.1454 | 2.0508 | 49 |
| 12 | 1.1243 | 2.1877 | 48 | 12 | 1.1347 | 2.1162 | 48 | 12 | 1.1456 | 2.0498 | 48 | 12 | 1.1456 | 2.0498 | 48 | 12 | 1.1456 | 2.0498 | 48 | 12 | 1.1456 | 2.0498 | 48 |
| 13 | 1.1245 | 2.1865 | 47 | 13 | 1.1349 | 2.1150 | 47 | 13 | 1.1458 | 2.0487 | 47 | 13 | 1.1458 | 2.0487 | 47 | 13 | 1.1458 | 2.0487 | 47 | 13 | 1.1458 | 2.0487 | 47 |
| 14 | 1.1247 | 2.1852 | 46 | 14 | 1.1350 | 2.1139 | 46 | 14 | 1.1460 | 2.0476 | 46 | 14 | 1.1460 | 2.0476 | 46 | 14 | 1.1460 | 2.0476 | 46 | 14 | 1.1460 | 2.0476 | 46 |
| 15 | 1.1248 | 2.1840 | 45 | 15 | 1.1352 | 2.1127 | 45 | 15 | 1.1461 | 2.0466 | 45 | 15 | 1.1461 | 2.0466 | 45 | 15 | 1.1461 | 2.0466 | 45 | 15 | 1.1461 | 2.0466 | 45 |
| 16 | 1.1250 | 2.1828 | 44 | 16 | 1.1354 | 2.1116 | 44 | 16 | 1.1463 | 2.0455 | 44 | 16 | 1.1463 | 2.0455 | 44 | 16 | 1.1463 | 2.0455 | 44 | 16 | 1.1463 | 2.0455 | 44 |
| 17 | 1.1252 | 2.1815 | 43 | 17 | 1.1356 | 2.1105 | 43 | 17 | 1.1465 | 2.0445 | 43 | 17 | 1.1465 | 2.0445 | 43 | 17 | 1.1465 | 2.0445 | 43 | 17 | 1.1465 | 2.0445 | 43 |
| 18 | 1.1253 | 2.1803 | 42 | 18 | 1.1357 | 2.1093 | 42 | 18 | 1.1467 | 2.0434 | 42 | 18 | 1.1467 | 2.0434 | 42 | 18 | 1.1467 | 2.0434 | 42 | 18 | 1.1467 | 2.0434 | 42 |
| 19 | 1.1255 | 2.1791 | 41 | 19 | 1.1359 | 2.1082 | 41 | 19 | 1.1469 | 2.0423 | 41 | 19 | 1.1469 | 2.0423 | 41 | 19 | 1.1469 | 2.0423 | 41 | 19 | 1.1469 | 2.0423 | 41 |
| 20 | 1.1257 | 2.1779 | 40 | 20 | 1.1361 | 2.1070 | 40 | 20 | 1.1471 | 2.0413 | 40 | 20 | 1.1471 | 2.0413 | 40 | 20 | 1.1471 | 2.0413 | 40 | 20 | 1.1471 | 2.0413 | 40 |
| 21 | 1.1259 | 2.1766 | 39 | 21 | 1.1363 | 2.1059 | 39 | 21 | 1.1473 | 2.0402 | 39 | 21 | 1.1473 | 2.0402 | 39 | 21 | 1.1473 | 2.0402 | 39 | 21 | 1.1473 | 2.0402 | 39 |
| 22 | 1.1260 | 2.1754 | 38 | 22 | 1.1365 | 2.1048 | 38 | 22 | 1.1474 | 2.0392 | 38 | 22 | 1.1474 | 2.0392 | 38 | 22 | 1.1474 | 2.0392 | 38 | 22 | 1.1474 | 2.0392 | 38 |
| 23 | 1.1262 | 2.1742 | 37 | 23 | 1.1366 | 2.1036 | 37 | 23 | 1.1476 | 2.0381 | 37 | 23 | 1.1476 | 2.0381 | 37 | 23 | 1.1476 | 2.0381 | 37 | 23 | 1.1476 | 2.0381 | 37 |
| 24 | 1.1264 | 2.1730 | 36 | 24 | 1.1368 | 2.1025 | 36 | 24 | 1.1478 | 2.0371 | 36 | 24 | 1.1478 | 2.0371 | 36 | 24 | 1.1478 | 2.0371 | 36 | 24 | 1.1478 | 2.0371 | 36 |
| 25 | 1.1265 | 2.1718 | 35 | 25 | 1.1370 | 2.1014 | 35 | 25 | 1.1480 | 2.0360 | 35 | 25 | 1.1480 | 2.0360 | 35 | 25 | 1.1480 | 2.0360 | 35 | 25 | 1.1480 | 2.0360 | 35 |
| 26 | 1.1267 | 2.1705 | 34 | 26 | 1.1372 | 2.1002 | 34 | 26 | 1.1482 | 2.0350 | 34 | 26 | 1.1482 | 2.0350 | 34 | 26 | 1.1482 | 2.0350 | 34 | 26 | 1.1482 | 2.0350 | 34 |
| 27 | 1.1269 | 2.1693 | 33 | 27 | 1.1374 | 2.0991 | 33 | 27 | 1.1484 | 2.0339 | 33 | 27 | 1.1484 | 2.0339 | 33 | 27 | 1.1484 | 2.0339 | 33 | 27 | 1.1484 | 2.0339 | 33 |
| 28 | 1.1270 | 2.1681 | 32 | 28 | 1.1375 | 2.0980 | 32 | 28 | 1.1486 | 2.0329 | 32 | 28 | 1.1486 | 2.0329 | 32 | 28 | 1.1486 | 2.0329 | 32 | 28 | 1.1486 | 2.0329 | 32 |
| 29 | 1.1272 | 2.1669 | 31 | 29 | 1.1377 | 2.0969 | 31 | 29 | 1.1488 | 2.0318 | 31 | 29 | 1.1488 | 2.0318 | 31 | 29 | 1.1488 | 2.0318 | 31 | 29 | 1.1488 | 2.0318 | 31 |
| 30 | 1.1274 | 2.1657 | 30 | 30 | 1.1379 | 2.0957 | 30 | 30 | 1.1490 | 2.0308 | 30 | 30 | 1.1490 | 2.0308 | 30 | 30 | 1.1490 | 2.0308 | 30 | 30 | 1.1490 | 2.0308 | 30 |
| 31 | 1.1276 | 2.1645 | 29 | 31 | 1.1381 | 2.0946 | 29 | 31 | 1.1491 | 2.0297 | 29 | 31 | 1.1491 | 2.0297 | 29 | 31 | 1.1491 | 2.0297 | 29 | 31 | 1.1491 | 2.0297 | 29 |
| 32 | 1.1277 | 2.1633 | 28 | 32 | 1.1383 | 2.0935 | 28 | 32 | 1.1493 | 2.0287 | 28 | 32 | 1.1493 | 2.0287 | 28 | 32 | 1.1493 | 2.0287 | 28 | 32 | 1.1493 | 2.0287 | 28 |
| 33 | 1.1279 | 2.1621 | 27 | 33 | 1.1384 | 2.0924 | 27 | 33 | 1.1495 | 2.0276 | 27 | 33 | 1.1495 | 2.0276 | 27 | 33 | 1.1495 | 2.0276 | 27 | 33 | 1.1495 | 2.0276 | 27 |
| 34 | 1.1281 | 2.1609 | 26 | 34 | 1.1386 | 2.0913 | 26 | 34 | 1.1497 | 2.0266 | 26 | 34 | 1.1497 | 2.0266 | 26 | 34 | 1.1497 | 2.0266 | 26 | 34 | 1.1497 | 2.0266 | 26 |
| 35 | 1.1282 | 2.1596 | 25 | 35 | 1.1388 | 2.0901 | 25 | 35 | 1.1499 | 2.0256 | 25 | 35 | 1.1499 | 2.0256 | 25 | 35 | 1.1499 | 2.0256 | 25 | 35 | 1.1499 | 2.0256 | 25 |
| 36 | 1.1284 | 2.1584 | 24 | 36 | 1.1390 | 2.0890 | 24 | 36 | 1.1501 | 2.0245 | 24 | 36 | 1.1501 | 2.0245 | 24 | 36 | 1.1501 | 2.0245 | 24 | 36 | 1.1501 | 2.0245 | 24 |
| 37 | 1.1286 | 2.1572 | 23 | 37 | 1.1392 | 2.0879 | 23 | 37 | 1.1503 | 2.0235 | 23 | 37 | 1.1503 | 2.0235 | 23 | 37 | 1.1503 | 2.0235 | 23 | 37 | 1.1503 | 2.0235 | 23 |
| 38 | 1.1288 | 2.1560 | 22 | 38 | 1.1393 | 2.0868 | 22 | 38 | 1.1505 | 2.0225 | 22 | 38 | 1.1505 | 2.0225 | 22 | 38 | 1.1505 | 2.0225 | 22 | 38 | 1.1505 | 2.0225 | 22 |
| 39 | 1.1289 | 2.1549 | 21 | 39 | 1.1395 | 2.0857 | 21 | 39 | 1.1507 | 2.0214 | 21 | 39 | 1.1507 | 2.0214 | 21 | 39 | 1.1507 | 2.0214 | 21 | 39 | 1.1507 | 2.0214 | 21 |
| 40 | 1.1291 | 2.1537 | 20 | 40 | 1.1397 | 2.0846 | 20 | 40 | 1.1509 | 2.0204 | 20 | 40 | 1.1509 | 2.0204 | 20 | 40 | 1.1509 | 2.0204 | 20 | 40 | 1.1509 | 2.0204 | 20 |
| 41 | 1.1293 | 2.1525 | 19 | 41 | 1.1399 | 2.0835 | 19 | 41 | 1.1510 | 2.0194 | 19 | 41 | 1.1510 | 2.0194 | 19 | 41 | 1.1510 | 2.0194 | 19 | 41 | 1.1510 | 2.0194 | 19 |
| 42 | 1.1294 | 2.1513 | 18 | 42 | 1.1401 | 2.0824 | 18 | 42 | 1.1512 | 2.0183 | 18 | 42 | 1.1512 | 2.0183 | 18 | 42 | 1.1512 | 2.0183 | 18 | 42 | 1.1512 | 2.0183 | 18 |
| 43 | 1.1296 | 2.1501 | 17 | 43 | 1.1402 | 2.0813 | 17 | 43 | 1.1514 | 2.0173 | 17 | 43 | 1.1514 | 2.0173 | 17 | 43 | 1.1514 | 2.0173 | 17 | 43 | 1.1514 | 2.0173 | 17 |
| 44 | 1.1298 | 2.1489 | 16 | 44 | 1.1404 | 2.0802 | 16 | 44 | 1.1516 | 2.0163 | 16 | 44 | 1.1516 | 2.0163 | 16 | 44 | 1.1516 | 2.0163 | 16 | 44 | 1.1516 | 2.0163 | 16 |
| 45 | 1.1300 | 2.1477 | 15 | 45 | 1.1406 | 2.0791 | 15 | 45 | 1.1518 | 2.0152 | 15 | 45 | 1.1518 | 2.0152 | 15 | 45 | 1.1518 | 2.0152 | 15 | 45 | 1.1518 | 2.0152 | 15 |
| 46 | 1.1301 | 2.1465 | 14 | 46 | 1.1408 | 2.0779 | 14 | 46 | 1.1520 | 2.0142 | 14 | 46 | 1.1520 | 2.0142 | 14 | 46 | 1.1520 | 2.0142 | 14 | 46 | 1.1520 | 2.0142 | 14 |
| 47 | 1.1303 | 2.1453 | 13 | 47 | 1.1410 | 2.0768 | 13 | 47 | 1.1522 | 2.0132 | 13 | 47 | 1.1522 | 2.0132 | 13 | 47 | 1.1522 | 2.0132 | 13 | 47 | 1.1522 | 2.0132 | 13 |
| 48 | 1.1305 | 2.1441 | 12 | 48 | 1.1412 | 2.0757 | 12 | 48 | 1.1524 | 2.0122 | 12 | 48 | 1.1524 | 2.0122 | 12 | 48 | 1.1524 | 2.0122 | 12 | 48 | 1.1524 | 2.0122 | 12 |
| 49 | 1.1307 | 2.1430 | 11 | 49 | 1.1413 | 2.0747 | 11 | 49 | 1.1526 | 2.0112 | 11 | 49 | 1.1526 | 2.0112 | 11 | 49 | 1.1526 | 2.0112 | 11 | 49 | 1.1526 | 2.0112 | 11 |
| 50 | 1.1308 | 2.1418 | 10 | 50 | 1.1415 | 2.0736 | 10 | 50 | 1.1528 | 2.0101 | 10 | 50 | 1.1528 | 2.0101 | 10 | 50 | 1.1528 | 2.0101 | 10 | 50 | 1.1528 | 2.0101 | 10 |
| 51 | 1.1310 | 2.1406 | 9 | 51 | 1.1417 | 2.0725 | 9 | 51 | 1.1530 | 2.0091 | 9 | 51 | 1.1530 | 2.0091 | 9 | 51 | 1.1530 | 2.0091 | 9 | 51 | 1.1530 | 2.0091 | 9 |
| 52 | 1.1312 | 2.1394 | 8 | 52 | 1.1419 | 2.0714 | 8 | 52 | 1.1532 | 2.0081 | 8 | 52 | 1.1532 | 2.0081 | 8 | 52 | 1.1532 | 2.0081 | 8 | 52 | 1.1532 | 2.0081 | 8 |
| 53 | 1.1313 | 2.1382 | 7 | 53 | 1.1421 | 2.0703 | 7 | 53 | 1.1533 | 2.0071 | 7 | 53 | 1.1533 | 2.0071 | 7 | 53 | 1.1533 | 2.0071 | 7 | 53 | 1.1533 | 2.0071 | 7 |
| 54 | | | | | | | | | | | | | | | | | | | | | | | |

NATURAL FUNCTIONS—SECANTS AND COSECANTS (Continued)

30° (210°)

(329°) 149°

31° (211°)

(328°) 148°

32° (212°)

(327°) 147°

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.1547 | 2.0000 | 60 |
| 1 | 1.1549 | 1.9990 | 59 |
| 2 | 1.1551 | 1.9980 | 58 |
| 3 | 1.1553 | 1.9970 | 57 |
| 4 | 1.1555 | 1.9960 | 56 |
| 5 | 1.1557 | 1.9950 | 55 |
| 6 | 1.1559 | 1.9940 | 54 |
| 7 | 1.1561 | 1.9930 | 53 |
| 8 | 1.1563 | 1.9920 | 52 |
| 9 | 1.1565 | 1.9910 | 51 |
| 10 | 1.1566 | 1.9900 | 50 |
| 11 | 1.1568 | 1.9890 | 49 |
| 12 | 1.1570 | 1.9880 | 48 |
| 13 | 1.1572 | 1.9870 | 47 |
| 14 | 1.1574 | 1.9860 | 46 |
| 15 | 1.1576 | 1.9850 | 45 |
| 16 | 1.1578 | 1.9840 | 44 |
| 17 | 1.1580 | 1.9830 | 43 |
| 18 | 1.1582 | 1.9821 | 42 |
| 19 | 1.1584 | 1.9811 | 41 |
| 20 | 1.1586 | 1.9801 | 40 |
| 21 | 1.1588 | 1.9791 | 39 |
| 22 | 1.1590 | 1.9781 | 38 |
| 23 | 1.1592 | 1.9771 | 37 |
| 24 | 1.1594 | 1.9762 | 36 |
| 25 | 1.1596 | 1.9752 | 35 |
| 26 | 1.1598 | 1.9742 | 34 |
| 27 | 1.1600 | 1.9732 | 33 |
| 28 | 1.1602 | 1.9722 | 32 |
| 29 | 1.1604 | 1.9713 | 31 |
| 30 | 1.1606 | 1.9703 | 30 |
| 31 | 1.1608 | 1.9693 | 29 |
| 32 | 1.1610 | 1.9684 | 28 |
| 33 | 1.1612 | 1.9674 | 27 |
| 34 | 1.1614 | 1.9664 | 26 |
| 35 | 1.1616 | 1.9654 | 25 |
| 36 | 1.1618 | 1.9645 | 24 |
| 37 | 1.1620 | 1.9635 | 23 |
| 38 | 1.1622 | 1.9625 | 22 |
| 39 | 1.1624 | 1.9616 | 21 |
| 40 | 1.1626 | 1.9606 | 20 |
| 41 | 1.1628 | 1.9597 | 19 |
| 42 | 1.1630 | 1.9587 | 18 |
| 43 | 1.1632 | 1.9577 | 17 |
| 44 | 1.1634 | 1.9568 | 16 |
| 45 | 1.1636 | 1.9558 | 15 |
| 46 | 1.1638 | 1.9549 | 14 |
| 47 | 1.1640 | 1.9539 | 13 |
| 48 | 1.1642 | 1.9530 | 12 |
| 49 | 1.1644 | 1.9520 | 11 |
| 50 | 1.1646 | 1.9511 | 10 |
| 51 | 1.1648 | 1.9501 | 9 |
| 52 | 1.1650 | 1.9492 | 8 |
| 53 | 1.1652 | 1.9482 | 7 |
| 54 | 1.1654 | 1.9473 | 6 |
| 55 | 1.1656 | 1.9463 | 5 |
| 56 | 1.1658 | 1.9454 | 4 |
| 57 | 1.1660 | 1.9444 | 3 |
| 58 | 1.1662 | 1.9435 | 2 |
| 59 | 1.1664 | 1.9425 | 1 |
| 60 | 1.1666 | 1.9416 | 0 |
| ' | Csc | Sec | ' |

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.1666 | 1.9416 | 60 |
| 1 | 1.1668 | 1.9407 | 59 |
| 2 | 1.1670 | 1.9397 | 58 |
| 3 | 1.1672 | 1.9388 | 57 |
| 4 | 1.1675 | 1.9379 | 56 |
| 5 | 1.1677 | 1.9369 | 55 |
| 6 | 1.1679 | 1.9360 | 54 |
| 7 | 1.1681 | 1.9351 | 53 |
| 8 | 1.1683 | 1.9341 | 52 |
| 9 | 1.1685 | 1.9332 | 51 |
| 10 | 1.1687 | 1.9323 | 50 |
| 11 | 1.1689 | 1.9313 | 49 |
| 12 | 1.1691 | 1.9304 | 48 |
| 13 | 1.1693 | 1.9295 | 47 |
| 14 | 1.1695 | 1.9285 | 46 |
| 15 | 1.1697 | 1.9276 | 45 |
| 16 | 1.1699 | 1.9267 | 44 |
| 17 | 1.1701 | 1.9258 | 43 |
| 18 | 1.1703 | 1.9249 | 42 |
| 19 | 1.1705 | 1.9239 | 41 |
| 20 | 1.1707 | 1.9230 | 40 |
| 21 | 1.1710 | 1.9221 | 39 |
| 22 | 1.1712 | 1.9212 | 38 |
| 23 | 1.1714 | 1.9203 | 37 |
| 24 | 1.1716 | 1.9194 | 36 |
| 25 | 1.1718 | 1.9184 | 35 |
| 26 | 1.1720 | 1.9175 | 34 |
| 27 | 1.1722 | 1.9166 | 33 |
| 28 | 1.1724 | 1.9157 | 32 |
| 29 | 1.1726 | 1.9148 | 31 |
| 30 | 1.1728 | 1.9139 | 30 |
| 31 | 1.1730 | 1.9130 | 29 |
| 32 | 1.1732 | 1.9121 | 28 |
| 33 | 1.1735 | 1.9112 | 27 |
| 34 | 1.1737 | 1.9103 | 26 |
| 35 | 1.1739 | 1.9094 | 25 |
| 36 | 1.1741 | 1.9084 | 24 |
| 37 | 1.1743 | 1.9075 | 23 |
| 38 | 1.1745 | 1.9066 | 22 |
| 39 | 1.1747 | 1.9057 | 21 |
| 40 | 1.1749 | 1.9048 | 20 |
| 41 | 1.1751 | 1.9039 | 19 |
| 42 | 1.1753 | 1.9031 | 18 |
| 43 | 1.1756 | 1.9022 | 17 |
| 44 | 1.1758 | 1.9013 | 16 |
| 45 | 1.1760 | 1.9004 | 15 |
| 46 | 1.1762 | 1.8995 | 14 |
| 47 | 1.1764 | 1.8986 | 13 |
| 48 | 1.1766 | 1.8977 | 12 |
| 49 | 1.1768 | 1.8968 | 11 |
| 50 | 1.1770 | 1.8959 | 10 |
| 51 | 1.1773 | 1.8950 | 9 |
| 52 | 1.1775 | 1.8941 | 8 |
| 53 | 1.1777 | 1.8933 | 7 |
| 54 | 1.1779 | 1.8924 | 6 |
| 55 | 1.1781 | 1.8915 | 5 |
| 56 | 1.1783 | 1.8906 | 4 |
| 57 | 1.1785 | 1.8897 | 3 |
| 58 | 1.1788 | 1.8888 | 2 |
| 59 | 1.1790 | 1.8880 | 1 |
| 60 | 1.1792 | 1.8871 | 0 |
| ' | Csc | Sec | ' |

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.1792 | 1.8871 | 60 |
| 1 | 1.1794 | 1.8862 | 59 |
| 2 | 1.1796 | 1.8853 | 58 |
| 3 | 1.1798 | 1.8844 | 57 |
| 4 | 1.1800 | 1.8836 | 56 |
| 5 | 1.1803 | 1.8827 | 55 |
| 6 | 1.1805 | 1.8818 | 54 |
| 7 | 1.1807 | 1.8810 | 53 |
| 8 | 1.1809 | 1.8801 | 52 |
| 9 | 1.1811 | 1.8792 | 51 |
| 10 | 1.1813 | 1.8783 | 50 |
| 11 | 1.1815 | 1.8775 | 49 |
| 12 | 1.1818 | 1.8766 | 48 |
| 13 | 1.1820 | 1.8757 | 47 |
| 14 | 1.1822 | 1.8749 | 46 |
| 15 | 1.1824 | 1.8740 | 45 |
| 16 | 1.1826 | 1.8731 | 44 |
| 17 | 1.1828 | 1.8723 | 43 |
| 18 | 1.1831 | 1.8714 | 42 |
| 19 | 1.1833 | 1.8706 | 41 |
| 20 | 1.1835 | 1.8697 | 40 |
| 21 | 1.1837 | 1.8688 | 39 |
| 22 | 1.1839 | 1.8680 | 38 |
| 23 | 1.1842 | 1.8671 | 37 |
| 24 | 1.1844 | 1.8663 | 36 |
| 25 | 1.1846 | 1.8654 | 35 |
| 26 | 1.1848 | 1.8646 | 34 |
| 27 | 1.1850 | 1.8637 | 33 |
| 28 | 1.1852 | 1.8629 | 32 |
| 29 | 1.1855 | 1.8620 | 31 |
| 30 | 1.1857 | 1.8612 | 30 |
| 31 | 1.1859 | 1.8603 | 29 |
| 32 | 1.1861 | 1.8595 | 28 |
| 33 | 1.1863 | 1.8586 | 27 |
| 34 | 1.1866 | 1.8578 | 26 |
| 35 | 1.1868 | 1.8569 | 25 |
| 36 | 1.1870 | 1.8561 | 24 |
| 37 | 1.1872 | 1.8552 | 23 |
| 38 | 1.1875 | 1.8544 | 22 |
| 39 | 1.1877 | 1.8535 | 21 |
| 40 | 1.1879 | 1.8527 | 20 |
| 41 | 1.1881 | 1.8519 | 19 |
| 42 | 1.1883 | 1.8510 | 18 |
| 43 | 1.1886 | 1.8502 | 17 |
| 44 | 1.1888 | 1.8494 | 16 |
| 45 | 1.1890 | 1.8485 | 15 |
| 46 | 1.1892 | 1.8477 | 14 |
| 47 | 1.1895 | 1.8468 | 13 |
| 48 | 1.1897 | 1.8460 | 12 |
| 49 | 1.1899 | 1.8452 | 11 |
| 50 | 1.1901 | 1.8443 | 10 |
| 51 | 1.1903 | 1.8435 | 9 |
| 52 | 1.1906 | 1.8427 | 8 |
| 53 | 1.1908 | 1.8419 | 7 |
| 54 | 1.1910 | 1.8410 | 6 |
| 55 | 1.1912 | 1.8402 | 5 |
| 56 | 1.1915 | 1.8394 | 4 |
| 57 | 1.1917 | 1.8385 | 3 |
| 58 | 1.1919 | 1.8377 | 2 |
| 59 | 1.1921 | 1.8369 | 1 |
| 60 | 1.1924 | 1.8361 | 0 |
| ' | Csc | Sec | ' |

120° (300°)

(239°) 59°

121° (301°)

(238°) 58°

122° (302°)

(237°) 57°

NATURAL FUNCTIONS—SECANTS AND COSECANTS (Continued)

33° (213°)
(329°) 146°
34° (214°)
(325°) 145°
35° (215°)
(324°) 144°

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.1924 | 1.8361 | 60 |
| 1 | 1.1926 | 1.8353 | 59 |
| 2 | 1.1928 | 1.8344 | 58 |
| 3 | 1.1930 | 1.8336 | 57 |
| 4 | 1.1933 | 1.8328 | 56 |
| 5 | 1.1935 | 1.8320 | 55 |
| 6 | 1.1937 | 1.8312 | 54 |
| 7 | 1.1939 | 1.8303 | 53 |
| 8 | 1.1942 | 1.8295 | 52 |
| 9 | 1.1944 | 1.8287 | 51 |
| 10 | 1.1946 | 1.8279 | 50 |
| 11 | 1.1949 | 1.8271 | 49 |
| 12 | 1.1951 | 1.8263 | 48 |
| 13 | 1.1953 | 1.8255 | 47 |
| 14 | 1.1955 | 1.8247 | 46 |
| 15 | 1.1958 | 1.8238 | 45 |
| 16 | 1.1960 | 1.8230 | 44 |
| 17 | 1.1962 | 1.8222 | 43 |
| 18 | 1.1964 | 1.8214 | 42 |
| 19 | 1.1967 | 1.8206 | 41 |
| 20 | 1.1969 | 1.8198 | 40 |
| 21 | 1.1971 | 1.8190 | 39 |
| 22 | 1.1974 | 1.8182 | 38 |
| 23 | 1.1976 | 1.8174 | 37 |
| 24 | 1.1978 | 1.8166 | 36 |
| 25 | 1.1981 | 1.8158 | 35 |
| 26 | 1.1983 | 1.8150 | 34 |
| 27 | 1.1985 | 1.8142 | 33 |
| 28 | 1.1987 | 1.8134 | 32 |
| 29 | 1.1990 | 1.8126 | 31 |
| 30 | 1.1992 | 1.8118 | 30 |
| 31 | 1.1994 | 1.8110 | 29 |
| 32 | 1.1997 | 1.8102 | 28 |
| 33 | 1.1999 | 1.8094 | 27 |
| 34 | 1.2001 | 1.8086 | 26 |
| 35 | 1.2004 | 1.8078 | 25 |
| 36 | 1.2006 | 1.8070 | 24 |
| 37 | 1.2008 | 1.8062 | 23 |
| 38 | 1.2011 | 1.8055 | 22 |
| 39 | 1.2013 | 1.8047 | 21 |
| 40 | 1.2015 | 1.8039 | 20 |
| 41 | 1.2018 | 1.8031 | 19 |
| 42 | 1.2020 | 1.8023 | 18 |
| 43 | 1.2022 | 1.8015 | 17 |
| 44 | 1.2025 | 1.8007 | 16 |
| 45 | 1.2027 | 1.8000 | 15 |
| 46 | 1.2029 | 1.7992 | 14 |
| 47 | 1.2032 | 1.7984 | 13 |
| 48 | 1.2034 | 1.7976 | 12 |
| 49 | 1.2036 | 1.7968 | 11 |
| 50 | 1.2039 | 1.7960 | 10 |
| 51 | 1.2041 | 1.7953 | 9 |
| 52 | 1.2043 | 1.7945 | 8 |
| 53 | 1.2046 | 1.7937 | 7 |
| 54 | 1.2048 | 1.7929 | 6 |
| 55 | 1.2050 | 1.7922 | 5 |
| 56 | 1.2053 | 1.7914 | 4 |
| 57 | 1.2055 | 1.7906 | 3 |
| 58 | 1.2057 | 1.7898 | 2 |
| 59 | 1.2060 | 1.7891 | 1 |
| 60 | 1.2062 | 1.7883 | 0 |
| ' | Csc | Sec | ' |

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.2062 | 1.7883 | 60 |
| 1 | 1.2065 | 1.7875 | 59 |
| 2 | 1.2067 | 1.7868 | 58 |
| 3 | 1.2069 | 1.7860 | 57 |
| 4 | 1.2072 | 1.7852 | 56 |
| 5 | 1.2074 | 1.7844 | 55 |
| 6 | 1.2076 | 1.7837 | 54 |
| 7 | 1.2079 | 1.7829 | 53 |
| 8 | 1.2081 | 1.7821 | 52 |
| 9 | 1.2084 | 1.7814 | 51 |
| 10 | 1.2086 | 1.7806 | 50 |
| 11 | 1.2088 | 1.7799 | 49 |
| 12 | 1.2091 | 1.7791 | 48 |
| 13 | 1.2093 | 1.7783 | 47 |
| 14 | 1.2096 | 1.7776 | 46 |
| 15 | 1.2098 | 1.7768 | 45 |
| 16 | 1.2100 | 1.7761 | 44 |
| 17 | 1.2103 | 1.7753 | 43 |
| 18 | 1.2105 | 1.7745 | 42 |
| 19 | 1.2108 | 1.7738 | 41 |
| 20 | 1.2110 | 1.7730 | 40 |
| 21 | 1.2112 | 1.7723 | 39 |
| 22 | 1.2115 | 1.7715 | 38 |
| 23 | 1.2117 | 1.7708 | 37 |
| 24 | 1.2120 | 1.7700 | 36 |
| 25 | 1.2122 | 1.7693 | 35 |
| 26 | 1.2124 | 1.7685 | 34 |
| 27 | 1.2127 | 1.7678 | 33 |
| 28 | 1.2129 | 1.7670 | 32 |
| 29 | 1.2132 | 1.7663 | 31 |
| 30 | 1.2134 | 1.7655 | 30 |
| 31 | 1.2136 | 1.7648 | 29 |
| 32 | 1.2139 | 1.7640 | 28 |
| 33 | 1.2141 | 1.7633 | 27 |
| 34 | 1.2144 | 1.7625 | 26 |
| 35 | 1.2146 | 1.7618 | 25 |
| 36 | 1.2149 | 1.7610 | 24 |
| 37 | 1.2151 | 1.7603 | 23 |
| 38 | 1.2154 | 1.7596 | 22 |
| 39 | 1.2156 | 1.7588 | 21 |
| 40 | 1.2158 | 1.7581 | 20 |
| 41 | 1.2161 | 1.7573 | 19 |
| 42 | 1.2163 | 1.7566 | 18 |
| 43 | 1.2166 | 1.7559 | 17 |
| 44 | 1.2168 | 1.7551 | 16 |
| 45 | 1.2171 | 1.7544 | 15 |
| 46 | 1.2173 | 1.7537 | 14 |
| 47 | 1.2176 | 1.7529 | 13 |
| 48 | 1.2178 | 1.7522 | 12 |
| 49 | 1.2181 | 1.7515 | 11 |
| 50 | 1.2183 | 1.7507 | 10 |
| 51 | 1.2185 | 1.7500 | 9 |
| 52 | 1.2188 | 1.7493 | 8 |
| 53 | 1.2190 | 1.7485 | 7 |
| 54 | 1.2193 | 1.7478 | 6 |
| 55 | 1.2195 | 1.7471 | 5 |
| 56 | 1.2198 | 1.7463 | 4 |
| 57 | 1.2200 | 1.7456 | 3 |
| 58 | 1.2203 | 1.7449 | 2 |
| 59 | 1.2205 | 1.7442 | 1 |
| 60 | 1.2208 | 1.7434 | 0 |
| ' | Csc | Sec | ' |

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.2208 | 1.7434 | 60 |
| 1 | 1.2210 | 1.7427 | 59 |
| 2 | 1.2213 | 1.7420 | 58 |
| 3 | 1.2215 | 1.7413 | 57 |
| 4 | 1.2218 | 1.7406 | 56 |
| 5 | 1.2220 | 1.7398 | 55 |
| 6 | 1.2223 | 1.7391 | 54 |
| 7 | 1.2225 | 1.7384 | 53 |
| 8 | 1.2228 | 1.7377 | 52 |
| 9 | 1.2230 | 1.7370 | 51 |
| 10 | 1.2233 | 1.7362 | 50 |
| 11 | 1.2235 | 1.7355 | 49 |
| 12 | 1.2238 | 1.7348 | 48 |
| 13 | 1.2240 | 1.7341 | 47 |
| 14 | 1.2243 | 1.7334 | 46 |
| 15 | 1.2245 | 1.7327 | 45 |
| 16 | 1.2248 | 1.7320 | 44 |
| 17 | 1.2250 | 1.7312 | 43 |
| 18 | 1.2253 | 1.7305 | 42 |
| 19 | 1.2255 | 1.7298 | 41 |
| 20 | 1.2258 | 1.7291 | 40 |
| 21 | 1.2260 | 1.7284 | 39 |
| 22 | 1.2263 | 1.7277 | 38 |
| 23 | 1.2265 | 1.7270 | 37 |
| 24 | 1.2268 | 1.7263 | 36 |
| 25 | 1.2271 | 1.7256 | 35 |
| 26 | 1.2273 | 1.7249 | 34 |
| 27 | 1.2276 | 1.7242 | 33 |
| 28 | 1.2278 | 1.7235 | 32 |
| 29 | 1.2281 | 1.7228 | 31 |
| 30 | 1.2283 | 1.7221 | 30 |
| 31 | 1.2286 | 1.7213 | 29 |
| 32 | 1.2288 | 1.7206 | 28 |
| 33 | 1.2291 | 1.7199 | 27 |
| 34 | 1.2293 | 1.7192 | 26 |
| 35 | 1.2296 | 1.7185 | 25 |
| 36 | 1.2299 | 1.7179 | 24 |
| 37 | 1.2301 | 1.7172 | 23 |
| 38 | 1.2304 | 1.7165 | 22 |
| 39 | 1.2306 | 1.7158 | 21 |
| 40 | 1.2309 | 1.7151 | 20 |
| 41 | 1.2311 | 1.7144 | 19 |
| 42 | 1.2314 | 1.7137 | 18 |
| 43 | 1.2317 | 1.7130 | 17 |
| 44 | 1.2319 | 1.7123 | 16 |
| 45 | 1.2322 | 1.7116 | 15 |
| 46 | 1.2324 | 1.7109 | 14 |
| 47 | 1.2327 | 1.7102 | 13 |
| 48 | 1.2329 | 1.7095 | 12 |
| 49 | 1.2332 | 1.7088 | 11 |
| 50 | 1.2335 | 1.7081 | 10 |
| 51 | 1.2337 | 1.7075 | 9 |
| 52 | 1.2340 | 1.7068 | 8 |
| 53 | 1.2342 | 1.7061 | 7 |
| 54 | 1.2345 | 1.7054 | 6 |
| 55 | 1.2348 | 1.7047 | 5 |
| 56 | 1.2350 | 1.7040 | 4 |
| 57 | 1.2353 | 1.7033 | 3 |
| 58 | 1.2355 | 1.7027 | 2 |
| 59 | 1.2358 | 1.7020 | 1 |
| 60 | 1.2361 | 1.7013 | 0 |
| ' | Csc | Sec | ' |

123° (303°)
(236°) 56°
124° (304°)
(235°) 55°
125° (305°)
(234°) 54°

NATURAL FUNCTIONS—SECANTS AND COSECANTS (Continued)

36° (216°)

(323°) 143°

37° (217°)

(322°) 142°

38° (218°)

(321°) 141°

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.2361 | 1.7013 | 60 |
| 1 | 1.2363 | 1.7006 | 59 |
| 2 | 1.2366 | 1.6999 | 58 |
| 3 | 1.2369 | 1.6993 | 57 |
| 4 | 1.2371 | 1.6986 | 56 |
| 5 | 1.2374 | 1.6979 | 55 |
| 6 | 1.2376 | 1.6972 | 54 |
| 7 | 1.2379 | 1.6966 | 53 |
| 8 | 1.2382 | 1.6959 | 52 |
| 9 | 1.2384 | 1.6952 | 51 |
| 10 | 1.2387 | 1.6945 | 50 |
| 11 | 1.2390 | 1.6939 | 49 |
| 12 | 1.2392 | 1.6932 | 48 |
| 13 | 1.2395 | 1.6925 | 47 |
| 14 | 1.2397 | 1.6918 | 46 |
| 15 | 1.2400 | 1.6912 | 45 |
| 16 | 1.2403 | 1.6905 | 44 |
| 17 | 1.2405 | 1.6898 | 43 |
| 18 | 1.2408 | 1.6892 | 42 |
| 19 | 1.2411 | 1.6885 | 41 |
| 20 | 1.2413 | 1.6878 | 40 |
| 21 | 1.2416 | 1.6871 | 39 |
| 22 | 1.2419 | 1.6865 | 38 |
| 23 | 1.2421 | 1.6858 | 37 |
| 24 | 1.2424 | 1.6852 | 36 |
| 25 | 1.2427 | 1.6845 | 35 |
| 26 | 1.2429 | 1.6838 | 34 |
| 27 | 1.2432 | 1.6832 | 33 |
| 28 | 1.2435 | 1.6825 | 32 |
| 29 | 1.2437 | 1.6818 | 31 |
| 30 | 1.2440 | 1.6812 | 30 |
| 31 | 1.2443 | 1.6805 | 29 |
| 32 | 1.2445 | 1.6799 | 28 |
| 33 | 1.2448 | 1.6792 | 27 |
| 34 | 1.2451 | 1.6785 | 26 |
| 35 | 1.2453 | 1.6779 | 25 |
| 36 | 1.2456 | 1.6772 | 24 |
| 37 | 1.2459 | 1.6766 | 23 |
| 38 | 1.2462 | 1.6759 | 22 |
| 39 | 1.2464 | 1.6753 | 21 |
| 40 | 1.2467 | 1.6746 | 20 |
| 41 | 1.2470 | 1.6739 | 19 |
| 42 | 1.2472 | 1.6733 | 18 |
| 43 | 1.2475 | 1.6726 | 17 |
| 44 | 1.2478 | 1.6720 | 16 |
| 45 | 1.2480 | 1.6713 | 15 |
| 46 | 1.2483 | 1.6707 | 14 |
| 47 | 1.2486 | 1.6700 | 13 |
| 48 | 1.2489 | 1.6694 | 12 |
| 49 | 1.2491 | 1.6687 | 11 |
| 50 | 1.2494 | 1.6681 | 10 |
| 51 | 1.2497 | 1.6674 | 9 |
| 52 | 1.2499 | 1.6668 | 8 |
| 53 | 1.2502 | 1.6661 | 7 |
| 54 | 1.2505 | 1.6655 | 6 |
| 55 | 1.2508 | 1.6649 | 5 |
| 56 | 1.2510 | 1.6642 | 4 |
| 57 | 1.2513 | 1.6636 | 3 |
| 58 | 1.2516 | 1.6629 | 2 |
| 59 | 1.2519 | 1.6623 | 1 |
| 60 | 1.2521 | 1.6616 | 0 |
| ' | Csc | Sec | ' |

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.2521 | 1.6616 | 60 |
| 1 | 1.2524 | 1.6610 | 59 |
| 2 | 1.2527 | 1.6604 | 58 |
| 3 | 1.2530 | 1.6597 | 57 |
| 4 | 1.2532 | 1.6591 | 56 |
| 5 | 1.2535 | 1.6584 | 55 |
| 6 | 1.2538 | 1.6578 | 54 |
| 7 | 1.2541 | 1.6572 | 53 |
| 8 | 1.2543 | 1.6565 | 52 |
| 9 | 1.2546 | 1.6559 | 51 |
| 10 | 1.2549 | 1.6553 | 50 |
| 11 | 1.2552 | 1.6546 | 49 |
| 12 | 1.2554 | 1.6540 | 48 |
| 13 | 1.2557 | 1.6534 | 47 |
| 14 | 1.2560 | 1.6527 | 46 |
| 15 | 1.2563 | 1.6521 | 45 |
| 16 | 1.2566 | 1.6515 | 44 |
| 17 | 1.2568 | 1.6508 | 43 |
| 18 | 1.2571 | 1.6502 | 42 |
| 19 | 1.2574 | 1.6496 | 41 |
| 20 | 1.2577 | 1.6489 | 40 |
| 21 | 1.2579 | 1.6483 | 39 |
| 22 | 1.2582 | 1.6477 | 38 |
| 23 | 1.2585 | 1.6471 | 37 |
| 24 | 1.2588 | 1.6464 | 36 |
| 25 | 1.2591 | 1.6458 | 35 |
| 26 | 1.2593 | 1.6452 | 34 |
| 27 | 1.2596 | 1.6446 | 33 |
| 28 | 1.2599 | 1.6439 | 32 |
| 29 | 1.2602 | 1.6433 | 31 |
| 30 | 1.2605 | 1.6427 | 30 |
| 31 | 1.2608 | 1.6421 | 29 |
| 32 | 1.2610 | 1.6414 | 28 |
| 33 | 1.2613 | 1.6408 | 27 |
| 34 | 1.2616 | 1.6402 | 26 |
| 35 | 1.2619 | 1.6396 | 25 |
| 36 | 1.2622 | 1.6390 | 24 |
| 37 | 1.2624 | 1.6383 | 23 |
| 38 | 1.2627 | 1.6377 | 22 |
| 39 | 1.2630 | 1.6371 | 21 |
| 40 | 1.2633 | 1.6365 | 20 |
| 41 | 1.2636 | 1.6359 | 19 |
| 42 | 1.2639 | 1.6353 | 18 |
| 43 | 1.2641 | 1.6346 | 17 |
| 44 | 1.2644 | 1.6340 | 16 |
| 45 | 1.2647 | 1.6334 | 15 |
| 46 | 1.2650 | 1.6328 | 14 |
| 47 | 1.2653 | 1.6322 | 13 |
| 48 | 1.2656 | 1.6316 | 12 |
| 49 | 1.2659 | 1.6310 | 11 |
| 50 | 1.2661 | 1.6303 | 10 |
| 51 | 1.2664 | 1.6297 | 9 |
| 52 | 1.2667 | 1.6291 | 8 |
| 53 | 1.2670 | 1.6285 | 7 |
| 54 | 1.2673 | 1.6279 | 6 |
| 55 | 1.2676 | 1.6273 | 5 |
| 56 | 1.2679 | 1.6267 | 4 |
| 57 | 1.2682 | 1.6261 | 3 |
| 58 | 1.2684 | 1.6255 | 2 |
| 59 | 1.2687 | 1.6249 | 1 |
| 60 | 1.2690 | 1.6243 | 0 |
| ' | Csc | Sec | ' |

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.2690 | 1.6243 | 60 |
| 1 | 1.2693 | 1.6237 | 59 |
| 2 | 1.2696 | 1.6231 | 58 |
| 3 | 1.2699 | 1.6225 | 57 |
| 4 | 1.2702 | 1.6219 | 56 |
| 5 | 1.2705 | 1.6213 | 55 |
| 6 | 1.2708 | 1.6207 | 54 |
| 7 | 1.2710 | 1.6201 | 53 |
| 8 | 1.2713 | 1.6195 | 52 |
| 9 | 1.2716 | 1.6189 | 51 |
| 10 | 1.2719 | 1.6183 | 50 |
| 11 | 1.2722 | 1.6177 | 49 |
| 12 | 1.2725 | 1.6171 | 48 |
| 13 | 1.2728 | 1.6165 | 47 |
| 14 | 1.2731 | 1.6159 | 46 |
| 15 | 1.2734 | 1.6153 | 45 |
| 16 | 1.2737 | 1.6147 | 44 |
| 17 | 1.2740 | 1.6141 | 43 |
| 18 | 1.2742 | 1.6135 | 42 |
| 19 | 1.2745 | 1.6129 | 41 |
| 20 | 1.2748 | 1.6123 | 40 |
| 21 | 1.2751 | 1.6117 | 39 |
| 22 | 1.2754 | 1.6111 | 38 |
| 23 | 1.2757 | 1.6105 | 37 |
| 24 | 1.2760 | 1.6099 | 36 |
| 25 | 1.2763 | 1.6093 | 35 |
| 26 | 1.2766 | 1.6087 | 34 |
| 27 | 1.2769 | 1.6082 | 33 |
| 28 | 1.2772 | 1.6076 | 32 |
| 29 | 1.2775 | 1.6070 | 31 |
| 30 | 1.2778 | 1.6064 | 30 |
| 31 | 1.2781 | 1.6058 | 29 |
| 32 | 1.2784 | 1.6052 | 28 |
| 33 | 1.2787 | 1.6046 | 27 |
| 34 | 1.2790 | 1.6040 | 26 |
| 35 | 1.2793 | 1.6035 | 25 |
| 36 | 1.2796 | 1.6029 | 24 |
| 37 | 1.2799 | 1.6023 | 23 |
| 38 | 1.2802 | 1.6017 | 22 |
| 39 | 1.2804 | 1.6011 | 21 |
| 40 | 1.2807 | 1.6005 | 20 |
| 41 | 1.2810 | 1.6000 | 19 |
| 42 | 1.2813 | 1.5994 | 18 |
| 43 | 1.2816 | 1.5988 | 17 |
| 44 | 1.2819 | 1.5982 | 16 |
| 45 | 1.2822 | 1.5976 | 15 |
| 46 | 1.2825 | 1.5971 | 14 |
| 47 | 1.2828 | 1.5965 | 13 |
| 48 | 1.2831 | 1.5959 | 12 |
| 49 | 1.2834 | 1.5953 | 11 |
| 50 | 1.2837 | 1.5948 | 10 |
| 51 | 1.2840 | 1.5942 | 9 |
| 52 | 1.2843 | 1.5936 | 8 |
| 53 | 1.2846 | 1.5930 | 7 |
| 54 | 1.2849 | 1.5925 | 6 |
| 55 | 1.2852 | 1.5919 | 5 |
| 56 | 1.2855 | 1.5913 | 4 |
| 57 | 1.2859 | 1.5907 | 3 |
| 58 | 1.2862 | 1.5902 | 2 |
| 59 | 1.2865 | 1.5896 | 1 |
| 60 | 1.2868 | 1.5890 | 0 |
| ' | Cs c | Sec | ' |

126° (306°)

(233°) 53°

127° (307°)

(232°) 52°

128° (308°)

(231°) 51°

NATURAL FUNCTIONS—SECANTS AND COSECANTS (Continued)

39° (219°)

(320°) 140°

40° (220°)

(319°) 139°

41° (221°)

(318°) 138°

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.2868 | 1.5890 | 60 |
| 1 | 1.2871 | 1.5884 | 59 |
| 2 | 1.2874 | 1.5879 | 58 |
| 3 | 1.2877 | 1.5873 | 57 |
| 4 | 1.2880 | 1.5867 | 56 |
| 5 | 1.2883 | 1.5862 | 55 |
| 6 | 1.2886 | 1.5856 | 54 |
| 7 | 1.2889 | 1.5850 | 53 |
| 8 | 1.2892 | 1.5845 | 52 |
| 9 | 1.2895 | 1.5839 | 51 |
| 10 | 1.2898 | 1.5833 | 50 |
| 11 | 1.2901 | 1.5828 | 49 |
| 12 | 1.2904 | 1.5822 | 48 |
| 13 | 1.2907 | 1.5816 | 47 |
| 14 | 1.2910 | 1.5811 | 46 |
| 15 | 1.2913 | 1.5805 | 45 |
| 16 | 1.2916 | 1.5800 | 44 |
| 17 | 1.2919 | 1.5794 | 43 |
| 18 | 1.2923 | 1.5788 | 42 |
| 19 | 1.2926 | 1.5783 | 41 |
| 20 | 1.2929 | 1.5777 | 40 |
| 21 | 1.2932 | 1.5771 | 39 |
| 22 | 1.2935 | 1.5766 | 38 |
| 23 | 1.2938 | 1.5760 | 37 |
| 24 | 1.2941 | 1.5755 | 36 |
| 25 | 1.2944 | 1.5749 | 35 |
| 26 | 1.2947 | 1.5744 | 34 |
| 27 | 1.2950 | 1.5738 | 33 |
| 28 | 1.2953 | 1.5732 | 32 |
| 29 | 1.2957 | 1.5727 | 31 |
| 30 | 1.2960 | 1.5721 | 30 |
| 31 | 1.2963 | 1.5716 | 29 |
| 32 | 1.2966 | 1.5710 | 28 |
| 33 | 1.2969 | 1.5705 | 27 |
| 34 | 1.2972 | 1.5699 | 26 |
| 35 | 1.2975 | 1.5694 | 25 |
| 36 | 1.2978 | 1.5688 | 24 |
| 37 | 1.2981 | 1.5683 | 23 |
| 38 | 1.2985 | 1.5677 | 22 |
| 39 | 1.2988 | 1.5672 | 21 |
| 40 | 1.2991 | 1.5666 | 20 |
| 41 | 1.2994 | 1.5661 | 19 |
| 42 | 1.2997 | 1.5655 | 18 |
| 43 | 1.3000 | 1.5650 | 17 |
| 44 | 1.3003 | 1.5644 | 16 |
| 45 | 1.3007 | 1.5639 | 15 |
| 46 | 1.3010 | 1.5633 | 14 |
| 47 | 1.3013 | 1.5628 | 13 |
| 48 | 1.3016 | 1.5622 | 12 |
| 49 | 1.3019 | 1.5617 | 11 |
| 50 | 1.3022 | 1.5611 | 10 |
| 51 | 1.3026 | 1.5606 | 9 |
| 52 | 1.3029 | 1.5601 | 8 |
| 53 | 1.3032 | 1.5595 | 7 |
| 54 | 1.3035 | 1.5590 | 6 |
| 55 | 1.3038 | 1.5584 | 5 |
| 56 | 1.3041 | 1.5579 | 4 |
| 57 | 1.3045 | 1.5573 | 3 |
| 58 | 1.3048 | 1.5568 | 2 |
| 59 | 1.3051 | 1.5563 | 1 |
| 60 | 1.3054 | 1.5557 | 0 |
| ' | Csc | Sec | ' |

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.3054 | 1.5557 | 60 |
| 1 | 1.3057 | 1.5552 | 59 |
| 2 | 1.3060 | 1.5546 | 58 |
| 3 | 1.3064 | 1.5541 | 57 |
| 4 | 1.3067 | 1.5536 | 56 |
| 5 | 1.3070 | 1.5530 | 55 |
| 6 | 1.3073 | 1.5525 | 54 |
| 7 | 1.3076 | 1.5520 | 53 |
| 8 | 1.3080 | 1.5514 | 52 |
| 9 | 1.3083 | 1.5509 | 51 |
| 10 | 1.3086 | 1.5504 | 50 |
| 11 | 1.3089 | 1.5498 | 49 |
| 12 | 1.3093 | 1.5493 | 48 |
| 13 | 1.3096 | 1.5488 | 47 |
| 14 | 1.3099 | 1.5482 | 46 |
| 15 | 1.3102 | 1.5477 | 45 |
| 16 | 1.3105 | 1.5472 | 44 |
| 17 | 1.3109 | 1.5466 | 43 |
| 18 | 1.3112 | 1.5461 | 42 |
| 19 | 1.3115 | 1.5456 | 41 |
| 20 | 1.3118 | 1.5450 | 40 |
| 21 | 1.3122 | 1.5445 | 39 |
| 22 | 1.3125 | 1.5440 | 38 |
| 23 | 1.3128 | 1.5435 | 37 |
| 24 | 1.3131 | 1.5429 | 36 |
| 25 | 1.3135 | 1.5424 | 35 |
| 26 | 1.3138 | 1.5419 | 34 |
| 27 | 1.3141 | 1.5413 | 33 |
| 28 | 1.3144 | 1.5408 | 32 |
| 29 | 1.3148 | 1.5403 | 31 |
| 30 | 1.3151 | 1.5398 | 30 |
| 31 | 1.3154 | 1.5392 | 29 |
| 32 | 1.3157 | 1.5387 | 28 |
| 33 | 1.3161 | 1.5382 | 27 |
| 34 | 1.3164 | 1.5377 | 26 |
| 35 | 1.3167 | 1.5372 | 25 |
| 36 | 1.3171 | 1.5366 | 24 |
| 37 | 1.3174 | 1.5361 | 23 |
| 38 | 1.3177 | 1.5356 | 22 |
| 39 | 1.3180 | 1.5351 | 21 |
| 40 | 1.3184 | 1.5345 | 20 |
| 41 | 1.3187 | 1.5340 | 19 |
| 42 | 1.3190 | 1.5335 | 18 |
| 43 | 1.3194 | 1.5330 | 17 |
| 44 | 1.3197 | 1.5325 | 16 |
| 45 | 1.3200 | 1.5320 | 15 |
| 46 | 1.3203 | 1.5314 | 14 |
| 47 | 1.3207 | 1.5309 | 13 |
| 48 | 1.3210 | 1.5304 | 12 |
| 49 | 1.3213 | 1.5299 | 11 |
| 50 | 1.3217 | 1.5294 | 10 |
| 51 | 1.3220 | 1.5289 | 9 |
| 52 | 1.3223 | 1.5283 | 8 |
| 53 | 1.3227 | 1.5278 | 7 |
| 54 | 1.3230 | 1.5273 | 6 |
| 55 | 1.3233 | 1.5268 | 5 |
| 56 | 1.3237 | 1.5263 | 4 |
| 57 | 1.3240 | 1.5258 | 3 |
| 58 | 1.3243 | 1.5253 | 2 |
| 59 | 1.3247 | 1.5248 | 1 |
| 60 | 1.3250 | 1.5243 | 0 |
| ' | Csc | Sec | ' |

| ' | Sec | Csc | ' |
|----|--------|--------|----|
| 0 | 1.3250 | 1.5243 | 60 |
| 1 | 1.3253 | 1.5237 | 59 |
| 2 | 1.3257 | 1.5232 | 58 |
| 3 | 1.3260 | 1.5227 | 57 |
| 4 | 1.3264 | 1.5222 | 56 |
| 5 | 1.3267 | 1.5217 | 55 |
| 6 | 1.3270 | 1.5212 | 54 |
| 7 | 1.3274 | 1.5207 | 53 |
| 8 | 1.3277 | 1.5202 | 52 |
| 9 | 1.3280 | 1.5197 | 51 |
| 10 | 1.3284 | 1.5192 | 50 |
| 11 | 1.3287 | 1.5187 | 49 |
| 12 | 1.3291 | 1.5182 | 48 |
| 13 | 1.3294 | 1.5177 | 47 |
| 14 | 1.3297 | 1.5172 | 46 |
| 15 | 1.3301 | 1.5167 | 45 |
| 16 | 1.3304 | 1.5162 | 44 |
| 17 | 1.3307 | 1.5156 | 43 |
| 18 | 1.3311 | 1.5151 | 42 |
| 19 | 1.3314 | 1.5146 | 41 |
| 20 | 1.3318 | 1.5141 | 40 |
| 21 | 1.3321 | 1.5136 | 39 |
| 22 | 1.3325 | 1.5131 | 38 |
| 23 | 1.3328 | 1.5126 | 37 |
| 24 | 1.3331 | 1.5121 | 36 |
| 25 | 1.3335 | 1.5116 | 35 |
| 26 | 1.3338 | 1.5111 | 34 |
| 27 | 1.3342 | 1.5107 | 33 |
| 28 | 1.3345 | 1.5102 | 32 |
| 29 | 1.3348 | 1.5097 | 31 |
| 30 | 1.3352 | 1.5092 | 30 |
| 31 | 1.3355 | 1.5087 | 29 |
| 32 | 1.3359 | 1.5082 | 28 |
| 33 | 1.3362 | 1.5077 | 27 |
| 34 | 1.3366 | 1.5072 | 26 |
| 35 | 1.3369 | 1.5067 | 25 |
| 36 | 1.3373 | 1.5062 | 24 |
| 37 | 1.3376 | 1.5057 | 23 |
| 38 | 1.3380 | 1.5052 | 22 |
| 39 | 1.3383 | 1.5047 | 21 |
| 40 | 1.3386 | 1.5042 | 20 |
| 41 | 1.3390 | 1.5037 | 19 |
| 42 | 1.3393 | 1.5032 | 18 |
| 43 | 1.3397 | 1.5027 | 17 |
| 44 | 1.3400 | 1.5023 | 16 |
| 45 | 1.3404 | 1.5018 | 15 |
| 46 | 1.3407 | 1.5013 | 14 |
| 47 | 1.3411 | 1.5008 | 13 |
| 48 | 1.3414 | 1.5003 | 12 |
| 49 | 1.3418 | 1.4998 | 11 |
| 50 | 1.3421 | 1.4993 | 10 |
| 51 | 1.3425 | 1.4988 | 9 |
| 52 | 1.3428 | 1.4984 | 8 |
| 53 | 1.3432 | 1.4979 | 7 |
| 54 | 1.3435 | 1.4974 | 6 |
| 55 | 1.3439 | 1.4969 | 5 |
| 56 | 1.3442 | 1.4964 | 4 |
| 57 | 1.3446 | 1.4959 | 3 |
| 58 | 1.3449 | 1.4954 | 2 |
| 59 | 1.3453 | 1.4950 | 1 |
| 60 | 1.3456 | 1.4945 | 0 |
| ' | Csc | Sec | ' |

129° (309°)

(230°) 50°

130° (310°)

(229°) 49°

131° (311°)

(228°) 48°

NATURAL FUNCTIONS—SECANTS AND COSECANTS (Continued)

| 42° (222°) | | | (317°) 137° | 43° (223°) | | | (316°) 136° | 44° (224°) | | | (315°) 135° |
|------------|--------|--------|-------------|------------|--------|--------|-------------|------------|--------|--------|-------------|
| ' | Sec | Csc | ' | ' | Sec | Csc | ' | ' | Sec | Csc | ' |
| 0 | 1.3456 | 1.4945 | 60 | 0 | 1.3673 | 1.4663 | 60 | 0 | 1.3902 | 1.4396 | 60 |
| 1 | 1.3460 | 1.4940 | 59 | 1 | 1.3677 | 1.4658 | 59 | 1 | 1.3906 | 1.4391 | 59 |
| 2 | 1.3463 | 1.4935 | 58 | 2 | 1.3681 | 1.4654 | 58 | 2 | 1.3909 | 1.4387 | 58 |
| 3 | 1.3467 | 1.4930 | 57 | 3 | 1.3684 | 1.4649 | 57 | 3 | 1.3913 | 1.4383 | 57 |
| 4 | 1.3470 | 1.4925 | 56 | 4 | 1.3688 | 1.4645 | 56 | 4 | 1.3917 | 1.4378 | 56 |
| 5 | 1.3474 | 1.4921 | 55 | 5 | 1.3692 | 1.4640 | 55 | 5 | 1.3921 | 1.4374 | 55 |
| 6 | 1.3478 | 1.4916 | 54 | 6 | 1.3696 | 1.4635 | 54 | 6 | 1.3925 | 1.4370 | 54 |
| 7 | 1.3481 | 1.4911 | 53 | 7 | 1.3699 | 1.4631 | 53 | 7 | 1.3929 | 1.4365 | 53 |
| 8 | 1.3485 | 1.4906 | 52 | 8 | 1.3703 | 1.4626 | 52 | 8 | 1.3933 | 1.4361 | 52 |
| 9 | 1.3488 | 1.4901 | 51 | 9 | 1.3707 | 1.4622 | 51 | 9 | 1.3937 | 1.4357 | 51 |
| 10 | 1.3492 | 1.4897 | 50 | 10 | 1.3711 | 1.4617 | 50 | 10 | 1.3941 | 1.4352 | 50 |
| 11 | 1.3495 | 1.4892 | 49 | 11 | 1.3714 | 1.4613 | 49 | 11 | 1.3945 | 1.4348 | 49 |
| 12 | 1.3499 | 1.4887 | 48 | 12 | 1.3718 | 1.4608 | 48 | 12 | 1.3949 | 1.4344 | 48 |
| 13 | 1.3502 | 1.4882 | 47 | 13 | 1.3722 | 1.4604 | 47 | 13 | 1.3953 | 1.4340 | 47 |
| 14 | 1.3506 | 1.4878 | 46 | 14 | 1.3726 | 1.4599 | 46 | 14 | 1.3957 | 1.4335 | 46 |
| 15 | 1.3510 | 1.4873 | 45 | 15 | 1.3729 | 1.4595 | 45 | 15 | 1.3961 | 1.4331 | 45 |
| 16 | 1.3513 | 1.4868 | 44 | 16 | 1.3733 | 1.4590 | 44 | 16 | 1.3965 | 1.4327 | 44 |
| 17 | 1.3517 | 1.4863 | 43 | 17 | 1.3737 | 1.4586 | 43 | 17 | 1.3969 | 1.4322 | 43 |
| 18 | 1.3520 | 1.4859 | 42 | 18 | 1.3741 | 1.4581 | 42 | 18 | 1.3972 | 1.4318 | 42 |
| 19 | 1.3524 | 1.4854 | 41 | 19 | 1.3744 | 1.4577 | 41 | 19 | 1.3976 | 1.4314 | 41 |
| 20 | 1.3527 | 1.4849 | 40 | 20 | 1.3748 | 1.4572 | 40 | 20 | 1.3980 | 1.4310 | 40 |
| 21 | 1.3531 | 1.4844 | 39 | 21 | 1.3752 | 1.4568 | 39 | 21 | 1.3984 | 1.4305 | 39 |
| 22 | 1.3535 | 1.4840 | 38 | 22 | 1.3756 | 1.4563 | 38 | 22 | 1.3988 | 1.4301 | 38 |
| 23 | 1.3538 | 1.4835 | 37 | 23 | 1.3759 | 1.4559 | 37 | 23 | 1.3992 | 1.4297 | 37 |
| 24 | 1.3542 | 1.4830 | 36 | 24 | 1.3763 | 1.4554 | 36 | 24 | 1.3996 | 1.4293 | 36 |
| 25 | 1.3545 | 1.4825 | 35 | 25 | 1.3767 | 1.4550 | 35 | 25 | 1.4000 | 1.4288 | 35 |
| 26 | 1.3549 | 1.4821 | 34 | 26 | 1.3771 | 1.4545 | 34 | 26 | 1.4004 | 1.4284 | 34 |
| 27 | 1.3553 | 1.4816 | 33 | 27 | 1.3775 | 1.4541 | 33 | 27 | 1.4008 | 1.4280 | 33 |
| 28 | 1.3556 | 1.4811 | 32 | 28 | 1.3778 | 1.4536 | 32 | 28 | 1.4012 | 1.4276 | 32 |
| 29 | 1.3560 | 1.4807 | 31 | 29 | 1.3782 | 1.4532 | 31 | 29 | 1.4016 | 1.4271 | 31 |
| 30 | 1.3563 | 1.4802 | 30 | 30 | 1.3786 | 1.4527 | 30 | 30 | 1.4020 | 1.4267 | 30 |
| 31 | 1.3567 | 1.4797 | 29 | 31 | 1.3790 | 1.4523 | 29 | 31 | 1.4024 | 1.4263 | 29 |
| 32 | 1.3571 | 1.4792 | 28 | 32 | 1.3794 | 1.4518 | 28 | 32 | 1.4028 | 1.4259 | 28 |
| 33 | 1.3574 | 1.4788 | 27 | 33 | 1.3797 | 1.4514 | 27 | 33 | 1.4032 | 1.4255 | 27 |
| 34 | 1.3578 | 1.4783 | 26 | 34 | 1.3801 | 1.4510 | 26 | 34 | 1.4036 | 1.4250 | 26 |
| 35 | 1.3582 | 1.4778 | 25 | 35 | 1.3805 | 1.4505 | 25 | 35 | 1.4040 | 1.4246 | 25 |
| 36 | 1.3585 | 1.4774 | 24 | 36 | 1.3809 | 1.4501 | 24 | 36 | 1.4044 | 1.4242 | 24 |
| 37 | 1.3589 | 1.4769 | 23 | 37 | 1.3813 | 1.4496 | 23 | 37 | 1.4048 | 1.4238 | 23 |
| 38 | 1.3592 | 1.4764 | 22 | 38 | 1.3817 | 1.4492 | 22 | 38 | 1.4052 | 1.4234 | 22 |
| 39 | 1.3596 | 1.4760 | 21 | 39 | 1.3820 | 1.4487 | 21 | 39 | 1.4057 | 1.4229 | 21 |
| 40 | 1.3600 | 1.4755 | 20 | 40 | 1.3824 | 1.4483 | 20 | 40 | 1.4061 | 1.4225 | 20 |
| 41 | 1.3603 | 1.4750 | 19 | 41 | 1.3828 | 1.4479 | 19 | 41 | 1.4065 | 1.4221 | 19 |
| 42 | 1.3607 | 1.4746 | 18 | 42 | 1.3832 | 1.4474 | 18 | 42 | 1.4069 | 1.4217 | 18 |
| 43 | 1.3611 | 1.4741 | 17 | 43 | 1.3836 | 1.4470 | 17 | 43 | 1.4073 | 1.4213 | 17 |
| 44 | 1.3614 | 1.4737 | 16 | 44 | 1.3840 | 1.4465 | 16 | 44 | 1.4077 | 1.4208 | 16 |
| 45 | 1.3618 | 1.4732 | 15 | 45 | 1.3843 | 1.4461 | 15 | 45 | 1.4081 | 1.4204 | 15 |
| 46 | 1.3622 | 1.4727 | 14 | 46 | 1.3847 | 1.4457 | 14 | 46 | 1.4085 | 1.4200 | 14 |
| 47 | 1.3625 | 1.4723 | 13 | 47 | 1.3851 | 1.4452 | 13 | 47 | 1.4089 | 1.4196 | 13 |
| 48 | 1.3629 | 1.4718 | 12 | 48 | 1.3855 | 1.4448 | 12 | 48 | 1.4093 | 1.4192 | 12 |
| 49 | 1.3633 | 1.4713 | 11 | 49 | 1.3859 | 1.4443 | 11 | 49 | 1.4097 | 1.4188 | 11 |
| 50 | 1.3636 | 1.4709 | 10 | 50 | 1.3863 | 1.4439 | 10 | 50 | 1.4101 | 1.4183 | 10 |
| 51 | 1.3640 | 1.4704 | 9 | 51 | 1.3867 | 1.4435 | 9 | 51 | 1.4105 | 1.4179 | 9 |
| 52 | 1.3644 | 1.4700 | 8 | 52 | 1.3871 | 1.4430 | 8 | 52 | 1.4109 | 1.4175 | 8 |
| 53 | 1.3647 | 1.4695 | 7 | 53 | 1.3874 | 1.4426 | 7 | 53 | 1.4113 | 1.4171 | 7 |
| 54 | 1.3651 | 1.4690 | 6 | 54 | 1.3878 | 1.4422 | 6 | 54 | 1.4118 | 1.4167 | 6 |
| 55 | 1.3655 | 1.4686 | 5 | 55 | 1.3882 | 1.4417 | 5 | 55 | 1.4122 | 1.4163 | 5 |
| 56 | 1.3658 | 1.4681 | 4 | 56 | 1.3886 | 1.4413 | 4 | 56 | 1.4126 | 1.4159 | 4 |
| 57 | 1.3662 | 1.4677 | 3 | 57 | 1.3890 | 1.4409 | 3 | 57 | 1.4130 | 1.4154 | 3 |
| 58 | 1.3666 | 1.4672 | 2 | 58 | 1.3894 | 1.4404 | 2 | 58 | 1.4134 | 1.4150 | 2 |
| 59 | 1.3670 | 1.4667 | 1 | 59 | 1.3898 | 1.4400 | 1 | 59 | 1.4138 | 1.4146 | 1 |
| 60 | 1.3673 | 1.4663 | 0 | 60 | 1.3902 | 1.4396 | 0 | 60 | 1.4142 | 1.4142 | 0 |
| ' | Csc | Sec | ' | ' | Csc | Sec | ' | ' | Csc | Sec | ' |

NATURAL TRIGONOMETRIC FUNCTIONS FOR ANGLES IN DEGREES AND DECIMALS

| Deg. | Sin | Cos | Tan | Cot | Deg. | Deg. | Sin | Cos | Tan | Cot | Deg. |
|------|--------|--------|--------|----------|------|------|--------|--------|--------|-------|------|
| 0.0 | .00000 | 1.0000 | .00000 | ∞ | 90.0 | 6.0 | .10453 | 0.9945 | .10510 | 9.514 | 84.0 |
| 1.0 | .00175 | 1.0000 | .00175 | 573.0 | .9 | 1.0 | .10626 | .9943 | .10687 | 9.357 | .9 |
| 2.0 | .00349 | 1.0000 | .00349 | 286.5 | .8 | 2.0 | .10800 | .9942 | .10863 | 9.205 | .8 |
| 3.0 | .00524 | 1.0000 | .00524 | 191.0 | .7 | 3.0 | .10973 | .9940 | .11040 | 9.058 | .7 |
| 4.0 | .00698 | 1.0000 | .00698 | 143.24 | .6 | 4.0 | .11147 | .9938 | .11217 | 8.915 | .6 |
| 5.0 | .00873 | 1.0000 | .00873 | 114.59 | .5 | 5.0 | .11320 | .9936 | .11394 | 8.777 | .5 |
| 6.0 | .01047 | 0.9999 | .01047 | 95.49 | .4 | 6.0 | .11494 | .9934 | .11570 | 8.643 | .4 |
| 7.0 | .01222 | .9999 | .01222 | 81.85 | .3 | 7.0 | .11667 | .9932 | .11747 | 8.513 | .3 |
| 8.0 | .01396 | .9999 | .01396 | 71.62 | .2 | 8.0 | .11840 | .9930 | .11924 | 8.386 | .2 |
| 9.0 | .01571 | .9999 | .01571 | 63.66 | .1 | 9.0 | .12014 | .9928 | .12101 | 8.264 | .1 |
| 1.0 | .01745 | 0.9998 | .01746 | 57.29 | 89.0 | 7.0 | .12187 | 0.9925 | .12278 | 8.144 | 83.0 |
| 2.0 | .01920 | .9998 | .01920 | 52.08 | .9 | 1.0 | .12360 | .9923 | .12456 | 8.028 | .9 |
| 3.0 | .02094 | .9998 | .02095 | 47.74 | .8 | 2.0 | .12533 | .9921 | .12633 | 7.916 | .8 |
| 4.0 | .02269 | .9997 | .02269 | 44.07 | .7 | 3.0 | .12706 | .9919 | .12810 | 7.806 | .7 |
| 5.0 | .02443 | .9997 | .02444 | 40.92 | .6 | 4.0 | .12880 | .9917 | .12988 | 7.700 | .6 |
| 6.0 | .02618 | .9997 | .02619 | 38.19 | .5 | 5.0 | .13053 | .9914 | .13165 | 7.596 | .5 |
| 7.0 | .02792 | .9996 | .02793 | 35.80 | .4 | 6.0 | .13226 | .9912 | .13343 | 7.495 | .4 |
| 8.0 | .02967 | .9996 | .02968 | 33.69 | .3 | 7.0 | .13399 | .9910 | .13521 | 7.396 | .3 |
| 9.0 | .03141 | .9995 | .03143 | 31.82 | .2 | 8.0 | .13572 | .9907 | .13698 | 7.300 | .2 |
| 1.0 | .03316 | .9995 | .03317 | 30.14 | .1 | 9.0 | .13744 | .9905 | .13876 | 7.207 | .1 |
| 2.0 | .03490 | 0.9994 | .03492 | 28.64 | 88.0 | 8.0 | .13917 | 0.9903 | .14054 | 7.115 | 82.0 |
| 3.0 | .03664 | .9993 | .03667 | 27.27 | .9 | 1.0 | .14090 | .9900 | .14232 | 7.026 | .9 |
| 4.0 | .03839 | .9993 | .03842 | 26.03 | .8 | 2.0 | .14263 | .9898 | .14410 | 6.940 | .8 |
| 5.0 | .04013 | .9992 | .04016 | 24.90 | .7 | 3.0 | .14436 | .9895 | .14588 | 6.855 | .7 |
| 6.0 | .04188 | .9991 | .04191 | 23.86 | .6 | 4.0 | .14608 | .9893 | .14767 | 6.772 | .6 |
| 7.0 | .04362 | .9990 | .04366 | 22.90 | .5 | 5.0 | .14781 | .9890 | .14945 | 6.691 | .5 |
| 8.0 | .04536 | .9990 | .04541 | 22.02 | .4 | 6.0 | .14954 | .9888 | .15124 | 6.612 | .4 |
| 9.0 | .04711 | .9989 | .04716 | 21.20 | .3 | 7.0 | .15126 | .9885 | .15302 | 6.535 | .3 |
| 1.0 | .04885 | .9988 | .04891 | 20.45 | .2 | 8.0 | .15299 | .9882 | .15481 | 6.460 | .2 |
| 2.0 | .05059 | .9987 | .05066 | 19.74 | .1 | 9.0 | .15471 | .9880 | .15660 | 6.386 | .1 |
| 3.0 | .05234 | 0.9986 | .05241 | 19.081 | 87.0 | 8.0 | .15643 | 0.9877 | .15838 | 6.314 | 81.0 |
| 4.0 | .05408 | .9985 | .05416 | 18.464 | .9 | 1.0 | .15816 | .9874 | .16017 | 6.243 | .9 |
| 5.0 | .05582 | .9984 | .05591 | 17.886 | .8 | 2.0 | .15988 | .9871 | .16196 | 6.174 | .8 |
| 6.0 | .05756 | .9983 | .05766 | 17.343 | .7 | 3.0 | .16160 | .9869 | .16376 | 6.107 | .7 |
| 7.0 | .05931 | .9982 | .05941 | 16.832 | .6 | 4.0 | .16333 | .9866 | .16555 | 6.041 | .6 |
| 8.0 | .06105 | .9981 | .06116 | 16.350 | .5 | 5.0 | .16505 | .9863 | .16734 | 5.976 | .5 |
| 9.0 | .06279 | .9980 | .06291 | 15.895 | .4 | 6.0 | .16677 | .9860 | .16914 | 5.912 | .4 |
| 1.0 | .06453 | .9979 | .06467 | 15.464 | .3 | 7.0 | .16849 | .9857 | .17093 | 5.850 | .3 |
| 2.0 | .06627 | .9978 | .06642 | 15.056 | .2 | 8.0 | .17021 | .9854 | .17273 | 5.789 | .2 |
| 3.0 | .06802 | .9977 | .06817 | 14.669 | .1 | 9.0 | .17193 | .9851 | .17453 | 5.730 | .1 |
| 4.0 | .06976 | 0.9976 | .06993 | 14.301 | 86.0 | 10.0 | .17366 | 0.9848 | .1763 | 5.671 | 80.0 |
| 5.0 | .07150 | .9974 | .07168 | 13.951 | .9 | 1.0 | .1754 | .9845 | .1781 | 5.614 | .9 |
| 6.0 | .07324 | .9973 | .07344 | 13.617 | .8 | 2.0 | .1771 | .9842 | .1799 | 5.558 | .8 |
| 7.0 | .07498 | .9972 | .07519 | 13.300 | .7 | 3.0 | .1788 | .9839 | .1817 | 5.503 | .7 |
| 8.0 | .07672 | .9971 | .07695 | 12.996 | .6 | 4.0 | .1805 | .9836 | .1835 | 5.449 | .6 |
| 9.0 | .07846 | .9969 | .07870 | 12.706 | .5 | 5.0 | .1822 | .9833 | .1853 | 5.396 | .5 |
| 1.0 | .08020 | .9968 | .08046 | 12.429 | .4 | 6.0 | .1840 | .9829 | .1871 | 5.343 | .4 |
| 2.0 | .08194 | .9966 | .08221 | 12.163 | .3 | 7.0 | .1857 | .9826 | .1890 | 5.292 | .3 |
| 3.0 | .08368 | .9965 | .08397 | 11.909 | .2 | 8.0 | .1874 | .9823 | .1908 | 5.242 | .2 |
| 4.0 | .08542 | .9963 | .08573 | 11.664 | .1 | 9.0 | .1891 | .9820 | .1926 | 5.193 | .1 |
| 5.0 | .08716 | 0.9962 | .08749 | 11.430 | 85.0 | 11.0 | .1908 | 0.9816 | .1944 | 5.145 | 79.0 |
| 6.0 | .08889 | .9960 | .08925 | 11.205 | .9 | 1.0 | .1925 | .9813 | .1962 | 5.097 | .9 |
| 7.0 | .09063 | .9959 | .09101 | 10.988 | .8 | 2.0 | .1942 | .9810 | .1980 | 5.050 | .8 |
| 8.0 | .09237 | .9957 | .09277 | 10.780 | .7 | 3.0 | .1959 | .9806 | .1998 | 5.005 | .7 |
| 9.0 | .09411 | .9956 | .09453 | 10.579 | .6 | 4.0 | .1977 | .9803 | .2016 | 4.959 | .6 |
| 1.0 | .09585 | .9954 | .09629 | 10.385 | .5 | 5.0 | .1994 | .9799 | .2035 | 4.915 | .5 |
| 2.0 | .09758 | .9952 | .09805 | 10.199 | .4 | 6.0 | .2011 | .9796 | .2053 | 4.872 | .4 |
| 3.0 | .09932 | .9951 | .09981 | 10.019 | .3 | 7.0 | .2028 | .9792 | .2071 | 4.829 | .3 |
| 4.0 | .10106 | .9949 | .10158 | 9.845 | .2 | 8.0 | .2045 | .9789 | .2089 | 4.787 | .2 |
| 5.0 | .10279 | .9947 | .10334 | 9.677 | .1 | 9.0 | .2062 | .9785 | .2107 | 4.745 | .1 |
| 6.0 | .10453 | 0.9945 | .10510 | 9.514 | 84.0 | 12.0 | .2079 | 0.9781 | .2126 | 4.705 | 78.0 |
| Deg. | Cos | Sin | Cot | Tan | Deg. | Deg. | Cos | Sin | Cot | Tan | Deg. |

NATURAL FUNCTIONS FOR DEGREES AND DECIMALS (Continued)

| Deg. | Sin | Cos | Tan | Cot | Deg. |
|------|--------|--------|--------|-------|------|
| 12.0 | 0.2079 | 0.9781 | 0.2126 | 4.705 | 78.0 |
| .1 | .2096 | .9778 | .2144 | 4.665 | .9 |
| .2 | .2113 | .9774 | .2162 | 4.625 | .8 |
| .3 | .2130 | .9770 | .2180 | 4.586 | .7 |
| .4 | .2147 | .9767 | .2199 | 4.548 | .6 |
| .5 | .2164 | .9763 | .2217 | 4.511 | .5 |
| .6 | .2181 | .9759 | .2235 | 4.474 | .4 |
| .7 | .2198 | .9755 | .2254 | 4.437 | .3 |
| .8 | .2215 | .9751 | .2272 | 4.402 | .2 |
| .9 | .2233 | .9748 | .2290 | 4.366 | .1 |
| 13.0 | 0.2250 | 0.9744 | 0.2309 | 4.331 | 77.0 |
| .1 | .2267 | .9740 | .2327 | 4.297 | .9 |
| .2 | .2284 | .9736 | .2345 | 4.264 | .8 |
| .3 | .2300 | .9732 | .2364 | 4.230 | .7 |
| .4 | .2317 | .9728 | .2382 | 4.198 | .6 |
| .5 | .2334 | .9724 | .2401 | 4.165 | .5 |
| .6 | .2351 | .9720 | .2419 | 4.134 | .4 |
| .7 | .2368 | .9715 | .2438 | 4.102 | .3 |
| .8 | .2385 | .9711 | .2456 | 4.071 | .2 |
| .9 | .2402 | .9707 | .2475 | 4.041 | .1 |
| 14.0 | 0.2419 | 0.9703 | 0.2493 | 4.011 | 76.0 |
| .1 | .2436 | .9699 | .2512 | 3.981 | .9 |
| .2 | .2453 | .9694 | .2530 | 3.952 | .8 |
| .3 | .2470 | .9690 | .2549 | 3.923 | .7 |
| .4 | .2487 | .9686 | .2568 | 3.895 | .6 |
| .5 | .2504 | .9681 | .2586 | 3.867 | .5 |
| .6 | .2521 | .9677 | .2605 | 3.839 | .4 |
| .7 | .2538 | .9673 | .2623 | 3.812 | .3 |
| .8 | .2554 | .9668 | .2642 | 3.785 | .2 |
| .9 | .2571 | .9664 | .2661 | 3.758 | .1 |
| 15.0 | 0.2588 | 0.9659 | 0.2679 | 3.732 | 75.0 |
| .1 | .2605 | .9655 | .2698 | 3.706 | .9 |
| .2 | .2622 | .9650 | .2717 | 3.681 | .8 |
| .3 | .2639 | .9646 | .2736 | 3.655 | .7 |
| .4 | .2656 | .9641 | .2754 | 3.630 | .6 |
| .5 | .2672 | .9636 | .2773 | 3.606 | .5 |
| .6 | .2689 | .9632 | .2792 | 3.582 | .4 |
| .7 | .2706 | .9627 | .2811 | 3.558 | .3 |
| .8 | .2723 | .9622 | .2830 | 3.534 | .2 |
| .9 | .2740 | .9617 | .2849 | 3.511 | .1 |
| 16.0 | 0.2756 | 0.9613 | 0.2867 | 3.487 | 74.0 |
| .1 | .2773 | .9608 | .2886 | 3.465 | .9 |
| .2 | .2790 | .9603 | .2905 | 3.442 | .8 |
| .3 | .2807 | .9598 | .2924 | 3.420 | .7 |
| .4 | .2823 | .9593 | .2943 | 3.398 | .6 |
| .5 | .2840 | .9588 | .2962 | 3.376 | .5 |
| .6 | .2857 | .9583 | .2981 | 3.354 | .4 |
| .7 | .2874 | .9578 | .3000 | 3.333 | .3 |
| .8 | .2890 | .9573 | .3019 | 3.312 | .2 |
| .9 | .2907 | .9568 | .3038 | 3.291 | .1 |
| 17.0 | 0.2924 | 0.9563 | 0.3057 | 3.271 | 73.0 |
| .1 | .2940 | .9558 | .3076 | 3.251 | .9 |
| .2 | .2957 | .9553 | .3096 | 3.230 | .8 |
| .3 | .2974 | .9548 | .3115 | 3.211 | .7 |
| .4 | .2990 | .9542 | .3134 | 3.191 | .6 |
| .5 | .3007 | .9537 | .3153 | 3.172 | .5 |
| .6 | .3024 | .9532 | .3172 | 3.152 | .4 |
| .7 | .3040 | .9527 | .3191 | 3.133 | .3 |
| .8 | .3057 | .9521 | .3211 | 3.115 | .2 |
| .9 | .3074 | .9516 | .3230 | 3.096 | .1 |
| 18.0 | 0.3090 | 0.9511 | 0.3249 | 3.078 | 72.0 |
| Deg. | Cos | Sin | Cot | Tan | Deg. |

| Deg. | Sin | Cos | Tan | Cot | Deg. |
|------|--------|--------|--------|-------|------|
| 18.0 | 0.3090 | 0.9511 | 0.3249 | 3.078 | 72.0 |
| .1 | .3107 | .9505 | .3269 | 3.060 | .9 |
| .2 | .3123 | .9500 | .3288 | 3.042 | .8 |
| .3 | .3140 | .9494 | .3307 | 3.024 | .7 |
| .4 | .3156 | .9489 | .3327 | 3.006 | .6 |
| .5 | .3173 | .9483 | .3346 | 2.989 | .5 |
| .6 | .3190 | .9478 | .3365 | 2.971 | .4 |
| .7 | .3206 | .9472 | .3385 | 2.954 | .3 |
| .8 | .3223 | .9466 | .3404 | 2.937 | .2 |
| .9 | .3239 | .9461 | .3424 | 2.921 | .1 |
| 19.0 | 0.3256 | 0.9455 | 0.3443 | 2.904 | 71.0 |
| .1 | .3272 | .9449 | .3463 | 2.888 | .9 |
| .2 | .3289 | .9444 | .3482 | 2.872 | .8 |
| .3 | .3305 | .9438 | .3502 | 2.856 | .7 |
| .4 | .3322 | .9432 | .3522 | 2.840 | .6 |
| .5 | .3338 | .9426 | .3541 | 2.824 | .5 |
| .6 | .3355 | .9421 | .3561 | 2.808 | .4 |
| .7 | .3371 | .9415 | .3581 | 2.793 | .3 |
| .8 | .3387 | .9409 | .3600 | 2.778 | .2 |
| .9 | .3404 | .9403 | .3620 | 2.762 | .1 |
| 20.0 | 0.3420 | 0.9397 | 0.3640 | 2.747 | 70.0 |
| .1 | .3437 | .9391 | .3659 | 2.733 | .9 |
| .2 | .3453 | .9385 | .3679 | 2.718 | .8 |
| .3 | .3469 | .9379 | .3699 | 2.703 | .7 |
| .4 | .3486 | .9373 | .3719 | 2.689 | .6 |
| .5 | .3502 | .9367 | .3739 | 2.675 | .5 |
| .6 | .3518 | .9361 | .3759 | 2.660 | .4 |
| .7 | .3535 | .9354 | .3779 | 2.646 | .3 |
| .8 | .3551 | .9348 | .3799 | 2.633 | .2 |
| .9 | .3567 | .9342 | .3819 | 2.619 | .1 |
| 21.0 | 0.3584 | 0.9336 | 0.3839 | 2.605 | 69.0 |
| .1 | .3600 | .9330 | .3859 | 2.592 | .9 |
| .2 | .3616 | .9323 | .3879 | 2.578 | .8 |
| .3 | .3633 | .9317 | .3899 | 2.565 | .7 |
| .4 | .3649 | .9311 | .3919 | 2.552 | .6 |
| .5 | .3665 | .9304 | .3939 | 2.539 | .5 |
| .6 | .3681 | .9298 | .3959 | 2.526 | .4 |
| .7 | .3697 | .9291 | .3979 | 2.513 | .3 |
| .8 | .3714 | .9285 | .4000 | 2.500 | .2 |
| .9 | .3730 | .9278 | .4020 | 2.488 | .1 |
| 22.0 | 0.3746 | 0.9272 | 0.4040 | 2.475 | 68.0 |
| .1 | .3762 | .9265 | .4061 | 2.463 | .9 |
| .2 | .3778 | .9259 | .4081 | 2.450 | .8 |
| .3 | .3795 | .9252 | .4101 | 2.438 | .7 |
| .4 | .3811 | .9245 | .4122 | 2.426 | .6 |
| .5 | .3827 | .9239 | .4142 | 2.414 | .5 |
| .6 | .3843 | .9232 | .4163 | 2.402 | .4 |
| .7 | .3859 | .9225 | .4183 | 2.391 | .3 |
| .8 | .3875 | .9219 | .4204 | 2.379 | .2 |
| .9 | .3891 | .9212 | .4224 | 2.367 | .1 |
| 23.0 | 0.3907 | 0.9205 | 0.4245 | 2.356 | 67.0 |
| .1 | .3923 | .9198 | .4265 | 2.344 | .9 |
| .2 | .3939 | .9191 | .4286 | 2.333 | .8 |
| .3 | .3955 | .9184 | .4307 | 2.322 | .7 |
| .4 | .3971 | .9178 | .4327 | 2.311 | .6 |
| .5 | .3987 | .9171 | .4348 | 2.300 | .5 |
| .6 | .4003 | .9164 | .4369 | 2.289 | .4 |
| .7 | .4019 | .9157 | .4390 | 2.278 | .3 |
| .8 | .4035 | .9150 | .4411 | 2.267 | .2 |
| .9 | .4051 | .9143 | .4431 | 2.257 | .1 |
| 24.0 | 0.4067 | 0.9135 | 0.4452 | 2.246 | 66.0 |
| Deg. | Cos | Sin | Cot | Tan | Deg. |

NATURAL FUNCTIONS FOR DEGREES AND DECIMALS (Continued)

| Deg. | Sin | Cos | Tan | Cot | Deg. | Deg. | Sin | Cos | Tan | Cot | Deg. |
|------|--------|--------|--------|-------|------|------|--------|--------|--------|--------|------|
| 24.0 | 0.4067 | 0.9135 | 0.4452 | 2.246 | 66.0 | 30.0 | 0.5000 | 0.8660 | 0.5774 | 1.7321 | 60.0 |
| 1 | .4083 | .9128 | .4473 | 2.236 | .9 | 1 | .5015 | .8652 | .5797 | 1.7251 | .9 |
| 2 | .4099 | .9121 | .4494 | 2.225 | .8 | 2 | .5030 | .8643 | .5820 | 1.7182 | .8 |
| 3 | .4115 | .9114 | .4515 | 2.215 | .7 | 3 | .5045 | .8634 | .5844 | 1.7113 | .7 |
| 4 | .4131 | .9107 | .4536 | 2.204 | .6 | 4 | .5060 | .8625 | .5867 | 1.7045 | .6 |
| 5 | .4147 | .9100 | .4557 | 2.194 | .5 | 5 | .5075 | .8616 | .5890 | 1.6977 | .5 |
| 6 | .4163 | .9092 | .4578 | 2.184 | .4 | 6 | .5090 | .8607 | .5914 | 1.6909 | .4 |
| 7 | .4179 | .9085 | .4599 | 2.174 | .3 | 7 | .5105 | .8599 | .5938 | 1.6842 | .3 |
| 8 | .4195 | .9078 | .4621 | 2.164 | .2 | 8 | .5120 | .8590 | .5961 | 1.6775 | .2 |
| 9 | .4210 | .9070 | .4642 | 2.154 | .1 | 9 | .5135 | .8581 | .5985 | 1.6709 | .1 |
| 25.0 | 0.4226 | 0.9063 | 0.4663 | 2.145 | 65.0 | 31.0 | 0.5150 | 0.8572 | 0.6009 | 1.6643 | 59.0 |
| 1 | .4242 | .9056 | .4684 | 2.135 | .9 | 1 | .5165 | .8563 | .6032 | 1.6577 | .9 |
| 2 | .4258 | .9048 | .4706 | 2.125 | .8 | 2 | .5180 | .8554 | .6056 | 1.6512 | .8 |
| 3 | .4274 | .9041 | .4727 | 2.116 | .7 | 3 | .5195 | .8545 | .6080 | 1.6447 | .7 |
| 4 | .4289 | .9033 | .4748 | 2.106 | .6 | 4 | .5210 | .8536 | .6104 | 1.6383 | .6 |
| 5 | .4305 | .9026 | .4770 | 2.097 | .5 | 5 | .5225 | .8526 | .6128 | 1.6319 | .5 |
| 6 | .4321 | .9018 | .4791 | 2.087 | .4 | 6 | .5240 | .8517 | .6152 | 1.6255 | .4 |
| 7 | .4337 | .9011 | .4813 | 2.078 | .3 | 7 | .5255 | .8508 | .6176 | 1.6191 | .3 |
| 8 | .4352 | .9003 | .4834 | 2.069 | .2 | 8 | .5270 | .8499 | .6200 | 1.6128 | .2 |
| 9 | .4368 | .8996 | .4856 | 2.059 | .1 | 9 | .5284 | .8490 | .6224 | 1.6066 | .1 |
| 26.0 | 0.4384 | 0.8988 | 0.4877 | 2.050 | 64.0 | 32.0 | 0.5299 | 0.8480 | 0.6249 | 1.6003 | 58.0 |
| 1 | .4399 | .8980 | .4899 | 2.041 | .9 | 1 | .5314 | .8471 | .6273 | 1.5941 | .9 |
| 2 | .4415 | .8973 | .4921 | 2.032 | .8 | 2 | .5329 | .8462 | .6297 | 1.5880 | .8 |
| 3 | .4431 | .8965 | .4942 | 2.023 | .7 | 3 | .5344 | .8453 | .6322 | 1.5818 | .7 |
| 4 | .4446 | .8957 | .4964 | 2.014 | .6 | 4 | .5358 | .8443 | .6346 | 1.5757 | .6 |
| 5 | .4462 | .8949 | .4986 | 2.006 | .5 | 5 | .5373 | .8434 | .6371 | 1.5697 | .5 |
| 6 | .4478 | .8942 | .5008 | 1.997 | .4 | 6 | .5388 | .8425 | .6395 | 1.5637 | .4 |
| 7 | .4493 | .8934 | .5029 | 1.988 | .3 | 7 | .5402 | .8415 | .6420 | 1.5577 | .3 |
| 8 | .4509 | .8926 | .5051 | 1.980 | .2 | 8 | .5417 | .8406 | .6445 | 1.5517 | .2 |
| 9 | .4524 | .8918 | .5073 | 1.971 | .1 | 9 | .5432 | .8396 | .6469 | 1.5458 | .1 |
| 27.0 | 0.4540 | 0.8910 | 0.5095 | 1.963 | 63.0 | 33.0 | 0.5446 | 0.8387 | 0.6494 | 1.5399 | 57.0 |
| 1 | .4555 | .8902 | .5117 | 1.954 | .9 | 1 | .5461 | .8377 | .6519 | 1.5340 | .9 |
| 2 | .4571 | .8894 | .5139 | 1.946 | .8 | 2 | .5476 | .8368 | .6544 | 1.5282 | .8 |
| 3 | .4586 | .8886 | .5161 | 1.937 | .7 | 3 | .5490 | .8358 | .6569 | 1.5224 | .7 |
| 4 | .4602 | .8878 | .5184 | 1.929 | .6 | 4 | .5505 | .8348 | .6594 | 1.5166 | .6 |
| 5 | .4617 | .8870 | .5206 | 1.921 | .5 | 5 | .5519 | .8339 | .6619 | 1.5108 | .5 |
| 6 | .4633 | .8862 | .5228 | 1.913 | .4 | 6 | .5534 | .8329 | .6644 | 1.5051 | .4 |
| 7 | .4648 | .8854 | .5250 | 1.905 | .3 | 7 | .5548 | .8320 | .6669 | 1.4994 | .3 |
| 8 | .4664 | .8846 | .5272 | 1.897 | .2 | 8 | .5563 | .8310 | .6694 | 1.4938 | .2 |
| 9 | .4679 | .8838 | .5295 | 1.889 | .1 | 9 | .5577 | .8300 | .6720 | 1.4882 | .1 |
| 28.0 | 0.4695 | 0.8829 | 0.5317 | 1.881 | 62.0 | 34.0 | 0.5592 | 0.8290 | 0.6745 | 1.4826 | 56.0 |
| 1 | .4710 | .8821 | .5340 | 1.873 | .9 | 1 | .5606 | .8281 | .6771 | 1.4770 | .9 |
| 2 | .4726 | .8813 | .5362 | 1.865 | .8 | 2 | .5621 | .8271 | .6796 | 1.4715 | .8 |
| 3 | .4741 | .8805 | .5384 | 1.857 | .7 | 3 | .5635 | .8261 | .6822 | 1.4659 | .7 |
| 4 | .4756 | .8796 | .5407 | 1.849 | .6 | 4 | .5650 | .8251 | .6847 | 1.4605 | .6 |
| 5 | .4772 | .8788 | .5430 | 1.842 | .5 | 5 | .5664 | .8241 | .6873 | 1.4550 | .5 |
| 6 | .4787 | .8780 | .5452 | 1.834 | .4 | 6 | .5678 | .8231 | .6899 | 1.4496 | .4 |
| 7 | .4802 | .8771 | .5475 | 1.827 | .3 | 7 | .5693 | .8221 | .6924 | 1.4442 | .3 |
| 8 | .4818 | .8763 | .5498 | 1.819 | .2 | 8 | .5707 | .8211 | .6950 | 1.4388 | .2 |
| 9 | .4833 | .8755 | .5520 | 1.811 | .1 | 9 | .5721 | .8202 | .6976 | 1.4335 | .1 |
| 29.0 | 0.4848 | 0.8746 | 0.5543 | 1.804 | 61.0 | 35.0 | 0.5736 | 0.8192 | 0.7002 | 1.4281 | 55.0 |
| 1 | .4863 | .8738 | .5566 | 1.797 | .9 | 1 | .5750 | .8181 | .7028 | 1.4229 | .9 |
| 2 | .4879 | .8729 | .5589 | 1.789 | .8 | 2 | .5764 | .8171 | .7054 | 1.4176 | .8 |
| 3 | .4894 | .8721 | .5612 | 1.782 | .7 | 3 | .5779 | .8161 | .7080 | 1.4124 | .7 |
| 4 | .4909 | .8712 | .5635 | 1.775 | .6 | 4 | .5793 | .8151 | .7107 | 1.4071 | .6 |
| 5 | .4924 | .8704 | .5658 | 1.767 | .5 | 5 | .5807 | .8141 | .7133 | 1.4019 | .5 |
| 6 | .4939 | .8695 | .5681 | 1.760 | .4 | 6 | .5821 | .8131 | .7159 | 1.3968 | .4 |
| 7 | .4955 | .8686 | .5704 | 1.753 | .3 | 7 | .5835 | .8121 | .7186 | 1.3916 | .3 |
| 8 | .4970 | .8678 | .5727 | 1.746 | .2 | 8 | .5850 | .8111 | .7212 | 1.3865 | .2 |
| 9 | .4985 | .8669 | .5750 | 1.739 | .1 | 9 | .5864 | .8100 | .7239 | 1.3814 | .1 |
| 30.0 | 0.5000 | 0.8660 | 0.5774 | 1.732 | 60.0 | 36.0 | 0.5878 | 0.8090 | 0.7265 | 1.3764 | 54.0 |
| Deg. | Cos | Sin | Cot | Tan | Deg. | Deg. | Cos | Sin | Cot | Tan | Deg. |

NATURAL FUNCTIONS FOR DEGREES AND DECIMALS (Continued)

| Deg. | Sin | Cos | Tan | Cot | Deg. |
|------|--------|--------|--------|--------|------|
| 36.0 | 0.5878 | 0.8090 | 0.7265 | 1.3764 | 54.0 |
| .1 | .5892 | .8080 | .7292 | 1.3713 | .9 |
| .2 | .5906 | .8070 | .7319 | 1.3663 | .8 |
| .3 | .5920 | .8059 | .7346 | 1.3613 | .7 |
| .4 | .5934 | .8049 | .7373 | 1.3564 | .6 |
| .5 | .5948 | .8039 | .7400 | 1.3514 | .5 |
| .6 | .5962 | .8028 | .7427 | 1.3465 | .4 |
| .7 | .5976 | .8018 | .7454 | 1.3416 | .3 |
| .8 | .5990 | .8007 | .7481 | 1.3367 | .2 |
| .9 | .6004 | .7997 | .7508 | 1.3319 | .1 |
| 37.0 | 0.6018 | 0.7986 | 0.7536 | 1.3270 | 53.0 |
| .1 | .6032 | .7976 | .7563 | 1.3222 | .9 |
| .2 | .6046 | .7965 | .7590 | 1.3175 | .8 |
| .3 | .6060 | .7955 | .7618 | 1.3127 | .7 |
| .4 | .6074 | .7944 | .7646 | 1.3079 | .6 |
| .5 | .6088 | .7934 | .7673 | 1.3032 | .5 |
| .6 | .6101 | .7923 | .7701 | 1.2985 | .4 |
| .7 | .6115 | .7912 | .7729 | 1.2938 | .3 |
| .8 | .6129 | .7902 | .7757 | 1.2892 | .2 |
| .9 | .6143 | .7891 | .7785 | 1.2846 | .1 |
| 38.0 | 0.6157 | 0.7880 | 0.7813 | 1.2799 | 52.0 |
| .1 | .6170 | .7869 | .7841 | 1.2753 | .9 |
| .2 | .6184 | .7859 | .7869 | 1.2708 | .8 |
| .3 | .6198 | .7848 | .7898 | 1.2662 | .7 |
| .4 | .6211 | .7837 | .7926 | 1.2617 | .6 |
| .5 | .6225 | .7826 | .7954 | 1.2572 | .5 |
| .6 | .6239 | .7815 | .7983 | 1.2527 | .4 |
| .7 | .6252 | .7804 | .8012 | 1.2482 | .3 |
| .8 | .6266 | .7793 | .8040 | 1.2437 | .2 |
| .9 | .6280 | .7782 | .8069 | 1.2393 | .1 |
| 39.0 | 0.6293 | 0.7771 | 0.8098 | 1.2349 | 51.0 |
| .1 | .6307 | .7760 | .8127 | 1.2305 | .9 |
| .2 | .6320 | .7749 | .8156 | 1.2261 | .8 |
| .3 | .6334 | .7738 | .8185 | 1.2218 | .7 |
| .4 | .6347 | .7727 | .8214 | 1.2174 | .6 |
| .5 | .6361 | .7716 | .8243 | 1.2131 | .5 |
| .6 | .6374 | .7705 | .8273 | 1.2088 | .4 |
| .7 | .6388 | .7694 | .8302 | 1.2045 | .3 |
| .8 | .6401 | .7683 | .8332 | 1.2002 | .2 |
| .9 | .6414 | .7672 | .8361 | 1.1960 | .1 |
| 40.0 | 0.6428 | 0.7660 | 0.8391 | 1.1918 | 50.0 |
| .1 | .6441 | .7649 | .8421 | 1.1875 | .9 |
| .2 | .6455 | .7638 | .8451 | 1.1833 | .8 |
| .3 | .6468 | .7627 | .8481 | 1.1792 | .7 |
| .4 | .6481 | .7615 | .8511 | 1.1750 | .6 |
| 40.5 | 0.6494 | 0.7604 | 0.8541 | 1.1708 | 49.5 |
| Deg. | Cos | Sin | Cot | Tan | Deg. |

| Deg. | Sin | Cos | Tan | Cot | Deg. |
|------|--------|--------|--------|--------|------|
| 40.5 | 0.6494 | 0.7604 | 0.8541 | 1.1708 | 49.5 |
| .6 | .6508 | .7593 | .8571 | 1.1667 | .4 |
| .7 | .6521 | .7581 | .8601 | 1.1626 | .3 |
| .8 | .6534 | .7570 | .8632 | 1.1585 | .2 |
| .9 | .6547 | .7559 | .8662 | 1.1544 | .1 |
| 41.0 | 0.6561 | 0.7547 | 0.8693 | 1.1504 | 49.0 |
| .1 | .6574 | .7536 | .8724 | 1.1463 | .9 |
| .2 | .6587 | .7524 | .8754 | 1.1423 | .8 |
| .3 | .6600 | .7513 | .8785 | 1.1383 | .7 |
| .4 | .6613 | .7501 | .8816 | 1.1343 | .6 |
| .5 | .6626 | .7490 | .8847 | 1.1303 | .5 |
| .6 | .6639 | .7478 | .8878 | 1.1263 | .4 |
| .7 | .6652 | .7466 | .8910 | 1.1224 | .3 |
| .8 | .6665 | .7455 | .8941 | 1.1184 | .2 |
| .9 | .6678 | .7443 | .8972 | 1.1145 | .1 |
| 42.0 | 0.6691 | 0.7431 | 0.9004 | 1.1106 | 48.0 |
| .1 | .6704 | .7420 | .9036 | 1.1067 | .9 |
| .2 | .6717 | .7408 | .9067 | 1.1028 | .8 |
| .3 | .6730 | .7396 | .9099 | 1.0990 | .7 |
| .4 | .6743 | .7385 | .9131 | 1.0951 | .6 |
| .5 | .6756 | .7373 | .9163 | 1.0913 | .5 |
| .6 | .6769 | .7361 | .9195 | 1.0875 | .4 |
| .7 | .6782 | .7349 | .9228 | 1.0837 | .3 |
| .8 | .6794 | .7337 | .9260 | 1.0799 | .2 |
| .9 | .6807 | .7325 | .9293 | 1.0761 | .1 |
| 43.0 | 0.6820 | 0.7314 | 0.9325 | 1.0724 | 47.0 |
| .1 | .6833 | .7302 | .9358 | 1.0686 | .9 |
| .2 | .6845 | .7290 | .9391 | 1.0649 | .8 |
| .3 | .6858 | .7278 | .9424 | 1.0612 | .7 |
| .4 | .6871 | .7266 | .9457 | 1.0575 | .6 |
| .5 | .6884 | .7254 | .9490 | 1.0538 | .5 |
| .6 | .6896 | .7242 | .9523 | 1.0501 | .4 |
| .7 | .6909 | .7230 | .9556 | 1.0464 | .3 |
| .8 | .6921 | .7218 | .9590 | 1.0428 | .2 |
| .9 | .6934 | .7206 | .9623 | 1.0392 | .1 |
| 44.0 | 0.6947 | 0.7193 | 0.9657 | 1.0355 | 46.0 |
| .1 | .6959 | .7181 | .9691 | 1.0319 | .9 |
| .2 | .6972 | .7169 | .9725 | 1.0283 | .8 |
| .3 | .6984 | .7157 | .9759 | 1.0247 | .7 |
| .4 | .6997 | .7145 | .9793 | 1.0212 | .6 |
| .5 | .7009 | .7133 | .9827 | 1.0176 | .5 |
| .6 | .7022 | .7120 | .9861 | 1.0141 | .4 |
| .7 | .7034 | .7108 | .9896 | 1.0105 | .3 |
| .8 | .7046 | .7096 | .9930 | 1.0070 | .2 |
| .9 | .7059 | .7083 | .9965 | 1.0035 | .1 |
| 45.0 | 0.7071 | 0.7071 | 1.0000 | 1.0000 | 45.0 |
| Deg. | Cos | Sin | Cot | Tan | Deg. |

LOGARITHMS OF TRIGONOMETRIC FUNCTIONS FOR ANGLES IN DEGREES AND DECIMALS

| Deg. | L. Sin | L. Cos | L. Tan | L. Cot | Deg. |
|------------|--------|--------|--------|--------|-------------|
| 0.0 | — ∞ | 0.0000 | — ∞ | ∞ | 90.0 |
| .1 | 7.2419 | 0.0000 | 7.2419 | 2.7581 | .9 |
| .2 | 7.5429 | 0.0000 | 7.5429 | 2.4571 | .8 |
| .3 | 7.7190 | 0.0000 | 7.7190 | 2.2810 | .7 |
| .4 | 7.8439 | 0.0000 | 7.8439 | 2.1561 | .6 |
| .5 | 7.9408 | 0.0000 | 7.9409 | 2.0591 | .5 |
| .6 | 8.0200 | 0.0000 | 8.0200 | 1.9800 | .4 |
| .7 | 8.0870 | 0.0000 | 8.0870 | 1.9130 | .3 |
| .8 | 8.1450 | 0.0000 | 8.1450 | 1.8550 | .2 |
| .9 | 8.1961 | 9.9999 | 8.1962 | 1.8038 | .1 |
| 1.0 | 8.2419 | 9.9999 | 8.2419 | 1.7581 | 89.0 |
| .1 | 8.2832 | 9.9999 | 8.2833 | 1.7167 | .9 |
| .2 | 8.3210 | 9.9999 | 8.3211 | 1.6789 | .8 |
| .3 | 8.3558 | 9.9999 | 8.3559 | 1.6441 | .7 |
| .4 | 8.3880 | 9.9999 | 8.3881 | 1.6119 | .6 |
| .5 | 8.4179 | 9.9999 | 8.4181 | 1.5819 | .5 |
| .6 | 8.4459 | 9.9998 | 8.4461 | 1.5539 | .4 |
| .7 | 8.4723 | 9.9998 | 8.4725 | 1.5275 | .3 |
| .8 | 8.4971 | 9.9998 | 8.4973 | 1.5027 | .2 |
| .9 | 8.5206 | 9.9998 | 8.5208 | 1.4792 | .1 |
| 2.0 | 8.5428 | 9.9997 | 8.5431 | 1.4569 | 88.0 |
| .1 | 8.5640 | 9.9997 | 8.5643 | 1.4357 | .9 |
| .2 | 8.5842 | 9.9997 | 8.5845 | 1.4155 | .8 |
| .3 | 8.6035 | 9.9996 | 8.6038 | 1.3962 | .7 |
| .4 | 8.6220 | 9.9996 | 8.6223 | 1.3777 | .6 |
| .5 | 8.6397 | 9.9996 | 8.6401 | 1.3599 | .5 |
| .6 | 8.6567 | 9.9996 | 8.6571 | 1.3429 | .4 |
| .7 | 8.6731 | 9.9995 | 8.6736 | 1.3264 | .3 |
| .8 | 8.6889 | 9.9995 | 8.6894 | 1.3106 | .2 |
| .9 | 8.7041 | 9.9994 | 8.7046 | 1.2954 | .1 |
| 3.0 | 8.7188 | 9.9994 | 8.7194 | 1.2806 | 87.0 |
| .1 | 8.7330 | 9.9994 | 8.7337 | 1.2663 | .9 |
| .2 | 8.7468 | 9.9993 | 8.7475 | 1.2525 | .8 |
| .3 | 8.7602 | 9.9993 | 8.7609 | 1.2391 | .7 |
| .4 | 8.7731 | 9.9992 | 8.7739 | 1.2261 | .6 |
| .5 | 8.7857 | 9.9992 | 8.7865 | 1.2135 | .5 |
| .6 | 8.7979 | 9.9991 | 8.7988 | 1.2012 | .4 |
| .7 | 8.8098 | 9.9991 | 8.8107 | 1.1893 | .3 |
| .8 | 8.8213 | 9.9990 | 8.8223 | 1.1777 | .2 |
| .9 | 8.8326 | 9.9990 | 8.8336 | 1.1664 | .1 |
| 4.0 | 8.8436 | 9.9989 | 8.8446 | 1.1554 | 86.0 |
| .1 | 8.8543 | 9.9989 | 8.8554 | 1.1446 | .9 |
| .2 | 8.8647 | 9.9988 | 8.8659 | 1.1341 | .8 |
| .3 | 8.8749 | 9.9988 | 8.8762 | 1.1238 | .7 |
| .4 | 8.8849 | 9.9987 | 8.8862 | 1.1138 | .6 |
| .5 | 8.8946 | 9.9987 | 8.8960 | 1.1040 | .5 |
| .6 | 8.9042 | 9.9986 | 8.9056 | 1.0944 | .4 |
| .7 | 8.9135 | 9.9985 | 8.9150 | 1.0850 | .3 |
| .8 | 8.9226 | 9.9985 | 8.9241 | 1.0759 | .2 |
| .9 | 8.9315 | 9.9984 | 8.9331 | 1.0669 | .1 |
| 5.0 | 8.9403 | 9.9983 | 8.9420 | 1.0580 | 85.0 |
| .1 | 8.9489 | 9.9983 | 8.9506 | 1.0494 | .9 |
| .2 | 8.9573 | 9.9982 | 8.9591 | 1.0409 | .8 |
| .3 | 8.9655 | 9.9981 | 8.9674 | 1.0326 | .7 |
| .4 | 8.9736 | 9.9981 | 8.9756 | 1.0244 | .6 |
| .5 | 8.9816 | 9.9980 | 8.9836 | 1.0164 | .5 |
| .6 | 8.9894 | 9.9979 | 8.9915 | 1.0085 | .4 |
| .7 | 8.9970 | 9.9978 | 8.9992 | 1.0008 | .3 |
| .8 | 9.0046 | 9.9978 | 9.0068 | 0.9932 | .2 |
| .9 | 9.0120 | 9.9977 | 9.0143 | 0.9857 | .1 |
| 6.0 | 9.0192 | 9.9976 | 9.0216 | 0.9784 | 84.0 |

| Deg. | L. Sin | L. Cos | L. Tan | L. Cot | Deg. |
|-------------|--------|--------|--------|--------|-------------|
| 6.0 | 9.0192 | 9.9976 | 9.0216 | 0.9784 | 84.0 |
| .1 | 9.0264 | 9.9975 | 9.0289 | 0.9711 | .9 |
| .2 | 9.0334 | 9.9975 | 9.0360 | 0.9640 | .8 |
| .3 | 9.0403 | 9.9974 | 9.0430 | 0.9570 | .7 |
| .4 | 9.0472 | 9.9973 | 9.0499 | 0.9501 | .6 |
| .5 | 9.0539 | 9.9972 | 9.0567 | 0.9433 | .5 |
| .6 | 9.0605 | 9.9971 | 9.0633 | 0.9367 | .4 |
| .7 | 9.0670 | 9.9970 | 9.0699 | 0.9301 | .3 |
| .8 | 9.0734 | 9.9969 | 9.0764 | 0.9236 | .2 |
| .9 | 9.0797 | 9.9968 | 9.0828 | 0.9172 | .1 |
| 7.0 | 9.0859 | 9.9968 | 9.0891 | 0.9109 | 83.0 |
| .1 | 9.0920 | 9.9967 | 9.0954 | 0.9046 | .9 |
| .2 | 9.0981 | 9.9966 | 9.1015 | 0.8985 | .8 |
| .3 | 9.1040 | 9.9965 | 9.1076 | 0.8924 | .7 |
| .4 | 9.1099 | 9.9964 | 9.1135 | 0.8865 | .6 |
| .5 | 9.1157 | 9.9963 | 9.1194 | 0.8806 | .5 |
| .6 | 9.1214 | 9.9962 | 9.1252 | 0.8748 | .4 |
| .7 | 9.1271 | 9.9961 | 9.1310 | 0.8690 | .3 |
| .8 | 9.1326 | 9.9960 | 9.1367 | 0.8633 | .2 |
| .9 | 9.1381 | 9.9959 | 9.1423 | 0.8577 | .1 |
| 8.0 | 9.1436 | 9.9958 | 9.1478 | 0.8522 | 82.0 |
| .1 | 9.1489 | 9.9956 | 9.1533 | 0.8467 | .9 |
| .2 | 9.1542 | 9.9955 | 9.1587 | 0.8413 | .8 |
| .3 | 9.1594 | 9.9954 | 9.1640 | 0.8360 | .7 |
| .4 | 9.1646 | 9.9953 | 9.1693 | 0.8307 | .6 |
| .5 | 9.1697 | 9.9952 | 9.1745 | 0.8255 | .5 |
| .6 | 9.1747 | 9.9951 | 9.1797 | 0.8203 | .4 |
| .7 | 9.1797 | 9.9950 | 9.1848 | 0.8152 | .3 |
| .8 | 9.1847 | 9.9949 | 9.1898 | 0.8102 | .2 |
| .9 | 9.1895 | 9.9947 | 9.1948 | 0.8052 | .1 |
| 9.0 | 9.1943 | 9.9946 | 9.1997 | 0.8003 | 81.0 |
| .1 | 9.1991 | 9.9945 | 9.2046 | 0.7954 | .9 |
| .2 | 9.2038 | 9.9944 | 9.2094 | 0.7906 | .8 |
| .3 | 9.2085 | 9.9943 | 9.2142 | 0.7858 | .7 |
| .4 | 9.2131 | 9.9941 | 9.2189 | 0.7811 | .6 |
| .5 | 9.2176 | 9.9940 | 9.2236 | 0.7764 | .5 |
| .6 | 9.2221 | 9.9939 | 9.2282 | 0.7718 | .4 |
| .7 | 9.2266 | 9.9937 | 9.2328 | 0.7672 | .3 |
| .8 | 9.2310 | 9.9936 | 9.2374 | 0.7626 | .2 |
| .9 | 9.2353 | 9.9935 | 9.2419 | 0.7581 | .1 |
| 10.0 | 9.2397 | 9.9934 | 9.2463 | 0.7537 | 80.0 |
| .1 | 9.2439 | 9.9932 | 9.2507 | 0.7493 | .9 |
| .2 | 9.2482 | 9.9931 | 9.2551 | 0.7449 | .8 |
| .3 | 9.2524 | 9.9929 | 9.2594 | 0.7406 | .7 |
| .4 | 9.2565 | 9.9928 | 9.2637 | 0.7363 | .6 |
| .5 | 9.2606 | 9.9927 | 9.2680 | 0.7320 | .5 |
| .6 | 9.2647 | 9.9925 | 9.2722 | 0.7278 | .4 |
| .7 | 9.2687 | 9.9924 | 9.2764 | 0.7236 | .3 |
| .8 | 9.2727 | 9.9922 | 9.2805 | 0.7195 | .2 |
| .9 | 9.2767 | 9.9921 | 9.2846 | 0.7154 | .1 |
| 11.0 | 9.2806 | 9.9919 | 9.2887 | 0.7113 | 79.0 |
| .1 | 9.2845 | 9.9918 | 9.2927 | 0.7073 | .9 |
| .2 | 9.2883 | 9.9916 | 9.2967 | 0.7033 | .8 |
| .3 | 9.2921 | 9.9915 | 9.3006 | 0.6994 | .7 |
| .4 | 9.2959 | 9.9913 | 9.3046 | 0.6954 | .6 |
| .5 | 9.2997 | 9.9912 | 9.3085 | 0.6915 | .5 |
| .6 | 9.3034 | 9.9910 | 9.3123 | 0.6877 | .4 |
| .7 | 9.3070 | 9.9909 | 9.3162 | 0.6838 | .3 |
| .8 | 9.3107 | 9.9907 | 9.3200 | 0.6800 | .2 |
| .9 | 9.3143 | 9.9906 | 9.3237 | 0.6763 | .1 |
| 12.0 | 9.3179 | 9.9904 | 9.3275 | 0.6725 | 78.0 |

| Deg. | L. Cos | L. Sin | L. Cot | L. Tan | Deg. |
|------|--------|--------|--------|--------|------|
|------|--------|--------|--------|--------|------|

| Deg. | L. Cos | L. Sin | L. Cot | L. Tan | Deg. |
|------|--------|--------|--------|--------|------|
|------|--------|--------|--------|--------|------|

LOGARITHMS OF FUNCTIONS FOR DEGREES AND DECIMALS (Continued)

| Deg. | L. Sin | L. Cos | L. Tan | L. Cot | Deg. |
|-------------|--------|--------|--------|--------|-------------|
| 12.0 | 9.3179 | 9.9904 | 9.3275 | 0.6725 | 78.0 |
| .1 | 9.3214 | 9.9902 | 9.3312 | 0.6688 | .9 |
| .2 | 9.3250 | 9.9901 | 9.3349 | 0.6651 | .8 |
| .3 | 9.3284 | 9.9899 | 9.3385 | 0.6615 | .7 |
| .4 | 9.3319 | 9.9897 | 9.3422 | 0.6578 | .6 |
| .5 | 9.3353 | 9.9896 | 9.3458 | 0.6542 | .5 |
| .6 | 9.3387 | 9.9894 | 9.3493 | 0.6507 | .4 |
| .7 | 9.3421 | 9.9892 | 9.3529 | 0.6471 | .3 |
| .8 | 9.3455 | 9.9891 | 9.3564 | 0.6436 | .2 |
| .9 | 9.3488 | 9.9889 | 9.3599 | 0.6401 | .1 |
| 13.0 | 9.3521 | 9.9887 | 9.3634 | 0.6366 | 77.0 |
| .1 | 9.3554 | 9.9885 | 9.3668 | 0.6332 | .9 |
| .2 | 9.3586 | 9.9884 | 9.3702 | 0.6298 | .8 |
| .3 | 9.3618 | 9.9882 | 9.3736 | 0.6264 | .7 |
| .4 | 9.3650 | 9.9880 | 9.3770 | 0.6230 | .6 |
| .5 | 9.3682 | 9.9878 | 9.3804 | 0.6196 | .5 |
| .6 | 9.3713 | 9.9876 | 9.3837 | 0.6163 | .4 |
| .7 | 9.3745 | 9.9875 | 9.3870 | 0.6130 | .3 |
| .8 | 9.3775 | 9.9873 | 9.3903 | 0.6097 | .2 |
| .9 | 9.3806 | 9.9871 | 9.3935 | 0.6065 | .1 |
| 14.0 | 9.3837 | 9.9869 | 9.3968 | 0.6032 | 76.0 |
| .1 | 9.3867 | 9.9867 | 9.4000 | 0.6000 | .9 |
| .2 | 9.3897 | 9.9865 | 9.4032 | 0.5968 | .8 |
| .3 | 9.3927 | 9.9863 | 9.4064 | 0.5936 | .7 |
| .4 | 9.3957 | 9.9861 | 9.4095 | 0.5905 | .6 |
| .5 | 9.3986 | 9.9859 | 9.4127 | 0.5873 | .5 |
| .6 | 9.4015 | 9.9857 | 9.4158 | 0.5842 | .4 |
| .7 | 9.4044 | 9.9855 | 9.4189 | 0.5811 | .3 |
| .8 | 9.4073 | 9.9853 | 9.4220 | 0.5780 | .2 |
| .9 | 9.4102 | 9.9851 | 9.4250 | 0.5750 | .1 |
| 15.0 | 9.4130 | 9.9849 | 9.4281 | 0.5719 | 75.0 |
| .1 | 9.4158 | 9.9847 | 9.4311 | 0.5689 | .9 |
| .2 | 9.4186 | 9.9845 | 9.4341 | 0.5659 | .8 |
| .3 | 9.4214 | 9.9843 | 9.4371 | 0.5629 | .7 |
| .4 | 9.4242 | 9.9841 | 9.4400 | 0.5600 | .6 |
| .5 | 9.4269 | 9.9839 | 9.4430 | 0.5570 | .5 |
| .6 | 9.4296 | 9.9837 | 9.4459 | 0.5541 | .4 |
| .7 | 9.4323 | 9.9835 | 9.4488 | 0.5512 | .3 |
| .8 | 9.4350 | 9.9833 | 9.4517 | 0.5483 | .2 |
| .9 | 9.4377 | 9.9831 | 9.4546 | 0.5454 | .1 |
| 16.0 | 9.4403 | 9.9828 | 9.4575 | 0.5425 | 74.0 |
| .1 | 9.4430 | 9.9826 | 9.4603 | 0.5397 | .9 |
| .2 | 9.4456 | 9.9824 | 9.4632 | 0.5368 | .8 |
| .3 | 9.4482 | 9.9822 | 9.4660 | 0.5340 | .7 |
| .4 | 9.4508 | 9.9820 | 9.4688 | 0.5312 | .6 |
| .5 | 9.4533 | 9.9817 | 9.4716 | 0.5284 | .5 |
| .6 | 9.4559 | 9.9815 | 9.4744 | 0.5256 | .4 |
| .7 | 9.4584 | 9.9813 | 9.4771 | 0.5229 | .3 |
| .8 | 9.4609 | 9.9811 | 9.4799 | 0.5201 | .2 |
| .9 | 9.4634 | 9.9808 | 9.4826 | 0.5174 | .1 |
| 17.0 | 9.4659 | 9.9806 | 9.4853 | 0.5147 | 73.0 |
| .1 | 9.4684 | 9.9804 | 9.4880 | 0.5120 | .9 |
| .2 | 9.4709 | 9.9801 | 9.4907 | 0.5093 | .8 |
| .3 | 9.4733 | 9.9799 | 9.4934 | 0.5066 | .7 |
| .4 | 9.4757 | 9.9797 | 9.4961 | 0.5039 | .6 |
| .5 | 9.4781 | 9.9794 | 9.4987 | 0.5013 | .5 |
| .6 | 9.4805 | 9.9792 | 9.5014 | 0.4986 | .4 |
| .7 | 9.4829 | 9.9789 | 9.5040 | 0.4960 | .3 |
| .8 | 9.4853 | 9.9787 | 9.5066 | 0.4934 | .2 |
| .9 | 9.4876 | 9.9785 | 9.5092 | 0.4908 | .1 |
| 18.0 | 9.4900 | 9.9782 | 9.5118 | 0.4882 | 72.0 |

| Deg. | L. Sin | L. Cos | L. Tan | L. Cot | Deg. |
|-------------|--------|--------|--------|--------|-------------|
| 18.0 | 9.4900 | 9.9782 | 9.5118 | 0.4882 | 72.0 |
| .1 | 9.4923 | 9.9780 | 9.5143 | 0.4857 | .9 |
| .2 | 9.4946 | 9.9777 | 9.5169 | 0.4831 | .8 |
| .3 | 9.4969 | 9.9775 | 9.5195 | 0.4805 | .7 |
| .4 | 9.4992 | 9.9772 | 9.5220 | 0.4780 | .6 |
| .5 | 9.5015 | 9.9770 | 9.5245 | 0.4755 | .5 |
| .6 | 9.5037 | 9.9767 | 9.5270 | 0.4730 | .4 |
| .7 | 9.5060 | 9.9764 | 9.5295 | 0.4705 | .3 |
| .8 | 9.5082 | 9.9762 | 9.5320 | 0.4680 | .2 |
| .9 | 9.5104 | 9.9759 | 9.5345 | 0.4655 | .1 |
| 19.0 | 9.5126 | 9.9757 | 9.5370 | 0.4630 | 71.0 |
| .1 | 9.5148 | 9.9754 | 9.5394 | 0.4606 | .9 |
| .2 | 9.5170 | 9.9751 | 9.5419 | 0.4581 | .8 |
| .3 | 9.5192 | 9.9749 | 9.5443 | 0.4557 | .7 |
| .4 | 9.5213 | 9.9746 | 9.5467 | 0.4533 | .6 |
| .5 | 9.5235 | 9.9743 | 9.5491 | 0.4509 | .5 |
| .6 | 9.5256 | 9.9741 | 9.5516 | 0.4484 | .4 |
| .7 | 9.5278 | 9.9738 | 9.5539 | 0.4461 | .3 |
| .8 | 9.5299 | 9.9735 | 9.5563 | 0.4437 | .2 |
| .9 | 9.5320 | 9.9733 | 9.5587 | 0.4413 | .1 |
| 20.0 | 9.5341 | 9.9730 | 9.5611 | 0.4389 | 70.0 |
| .1 | 9.5361 | 9.9727 | 9.5634 | 0.4366 | .9 |
| .2 | 9.5382 | 9.9724 | 9.5658 | 0.4342 | .8 |
| .3 | 9.5402 | 9.9722 | 9.5681 | 0.4319 | .7 |
| .4 | 9.5423 | 9.9719 | 9.5704 | 0.4296 | .6 |
| .5 | 9.5443 | 9.9716 | 9.5727 | 0.4273 | .5 |
| .6 | 9.5463 | 9.9713 | 9.5750 | 0.4250 | .4 |
| .7 | 9.5484 | 9.9710 | 9.5773 | 0.4227 | .3 |
| .8 | 9.5504 | 9.9707 | 9.5796 | 0.4204 | .2 |
| .9 | 9.5523 | 9.9704 | 9.5819 | 0.4181 | .1 |
| 21.0 | 9.5543 | 9.9702 | 9.5842 | 0.4158 | 69.0 |
| .1 | 9.5563 | 9.9699 | 9.5864 | 0.4136 | .9 |
| .2 | 9.5583 | 9.9696 | 9.5887 | 0.4113 | .8 |
| .3 | 9.5602 | 9.9693 | 9.5909 | 0.4091 | .7 |
| .4 | 9.5621 | 9.9690 | 9.5932 | 0.4068 | .6 |
| .5 | 9.5641 | 9.9687 | 9.5954 | 0.4046 | .5 |
| .6 | 9.5660 | 9.9684 | 9.5976 | 0.4024 | .4 |
| .7 | 9.5679 | 9.9681 | 9.5998 | 0.4002 | .3 |
| .8 | 9.5698 | 9.9678 | 9.6020 | 0.3980 | .2 |
| .9 | 9.5717 | 9.9675 | 9.6042 | 0.3958 | .1 |
| 22.0 | 9.5736 | 9.9672 | 9.6064 | 0.3936 | 68.0 |
| .1 | 9.5754 | 9.9669 | 9.6086 | 0.3914 | .9 |
| .2 | 9.5773 | 9.9666 | 9.6108 | 0.3892 | .8 |
| .3 | 9.5792 | 9.9662 | 9.6129 | 0.3871 | .7 |
| .4 | 9.5810 | 9.9659 | 9.6151 | 0.3849 | .6 |
| .5 | 9.5828 | 9.9656 | 9.6172 | 0.3828 | .5 |
| .6 | 9.5847 | 9.9653 | 9.6194 | 0.3806 | .4 |
| .7 | 9.5865 | 9.9650 | 9.6215 | 0.3785 | .3 |
| .8 | 9.5883 | 9.9647 | 9.6236 | 0.3764 | .2 |
| .9 | 9.5901 | 9.9643 | 9.6257 | 0.3743 | .1 |
| 23.0 | 9.5919 | 9.9640 | 9.6279 | 0.3721 | 67.0 |
| .1 | 9.5937 | 9.9637 | 9.6300 | 0.3700 | .9 |
| .2 | 9.5954 | 9.9634 | 9.6321 | 0.3679 | .8 |
| .3 | 9.5972 | 9.9631 | 9.6341 | 0.3659 | .7 |
| .4 | 9.5990 | 9.9627 | 9.6362 | 0.3638 | .6 |
| .5 | 9.6007 | 9.9624 | 9.6383 | 0.3617 | .5 |
| .6 | 9.6024 | 9.9621 | 9.6404 | 0.3596 | .4 |
| .7 | 9.6042 | 9.9617 | 9.6424 | 0.3576 | .3 |
| .8 | 9.6059 | 9.9614 | 9.6445 | 0.3555 | .2 |
| .9 | 9.6076 | 9.9611 | 9.6465 | 0.3535 | .1 |
| 24.0 | 9.6093 | 9.9607 | 9.6486 | 0.3514 | 66.0 |

| Deg. | L. Cos | L. Sin | L. Cot | L. Tan | Deg. |
|------|--------|--------|--------|--------|------|
|------|--------|--------|--------|--------|------|

LOGARITHMS OF FUNCTIONS FOR DEGREES AND DECIMALS (Continued)

| Deg. | L. Sin | L. Cos | L. Tan | L. Cot | Deg. |
|------|--------|--------|--------|--------|------|
| 24.0 | 9.6093 | 9.9607 | 9.6486 | 0.3514 | 66.0 |
| .1 | 9.6110 | 9.9604 | 9.6506 | 0.3494 | .9 |
| .2 | 9.6127 | 9.9601 | 9.6527 | 0.3473 | .8 |
| .3 | 9.6144 | 9.9597 | 9.6547 | 0.3453 | .7 |
| .4 | 9.6161 | 9.9594 | 9.6567 | 0.3433 | .6 |
| .5 | 9.6177 | 9.9590 | 9.6587 | 0.3413 | .5 |
| .6 | 9.6194 | 9.9587 | 9.6607 | 0.3393 | .4 |
| .7 | 9.6210 | 9.9583 | 9.6627 | 0.3373 | .3 |
| .8 | 9.6227 | 9.9580 | 9.6647 | 0.3353 | .2 |
| .9 | 9.6243 | 9.9576 | 9.6667 | 0.3333 | .1 |
| 25.0 | 9.6259 | 9.9573 | 9.6687 | 0.3313 | 55.0 |
| .1 | 9.6276 | 9.9569 | 9.6706 | 0.3294 | .9 |
| .2 | 9.6292 | 9.9566 | 9.6726 | 0.3274 | .8 |
| .3 | 9.6308 | 9.9562 | 9.6746 | 0.3254 | .7 |
| .4 | 9.6324 | 9.9558 | 9.6765 | 0.3235 | .6 |
| .5 | 9.6340 | 9.9555 | 9.6785 | 0.3215 | .5 |
| .6 | 9.6356 | 9.9551 | 9.6804 | 0.3196 | .4 |
| .7 | 9.6371 | 9.9548 | 9.6824 | 0.3176 | .3 |
| .8 | 9.6387 | 9.9544 | 9.6843 | 0.3157 | .2 |
| .9 | 9.6403 | 9.9540 | 9.6863 | 0.3137 | .1 |
| 26.0 | 9.6418 | 9.9537 | 9.6882 | 0.3118 | 64.0 |
| .1 | 9.6434 | 9.9533 | 9.6901 | 0.3099 | .9 |
| .2 | 9.6449 | 9.9529 | 9.6920 | 0.3080 | .8 |
| .3 | 9.6465 | 9.9525 | 9.6939 | 0.3061 | .7 |
| .4 | 9.6480 | 9.9522 | 9.6958 | 0.3042 | .6 |
| .5 | 9.6495 | 9.9518 | 9.6977 | 0.3023 | .5 |
| .6 | 9.6510 | 9.9514 | 9.6996 | 0.3004 | .4 |
| .7 | 9.6526 | 9.9510 | 9.7015 | 0.2985 | .3 |
| .8 | 9.6541 | 9.9506 | 9.7034 | 0.2966 | .2 |
| .9 | 9.6556 | 9.9503 | 9.7053 | 0.2947 | .1 |
| 27.0 | 9.6570 | 9.9499 | 9.7072 | 0.2928 | 63.0 |
| .1 | 9.6585 | 9.9495 | 9.7090 | 0.2910 | .9 |
| .2 | 9.6600 | 9.9491 | 9.7109 | 0.2891 | .8 |
| .3 | 9.6615 | 9.9487 | 9.7128 | 0.2872 | .7 |
| .4 | 9.6629 | 9.9483 | 9.7146 | 0.2854 | .6 |
| .5 | 9.6644 | 9.9479 | 9.7165 | 0.2835 | .5 |
| .6 | 9.6659 | 9.9475 | 9.7183 | 0.2817 | .4 |
| .7 | 9.6673 | 9.9471 | 9.7202 | 0.2798 | .3 |
| .8 | 9.6687 | 9.9467 | 9.7220 | 0.2780 | .2 |
| .9 | 9.6702 | 9.9463 | 9.7238 | 0.2762 | .1 |
| 28.0 | 9.6716 | 9.9459 | 9.7257 | 0.2743 | 62.0 |
| .1 | 9.6730 | 9.9455 | 9.7275 | 0.2725 | .9 |
| .2 | 9.6744 | 9.9451 | 9.7293 | 0.2707 | .8 |
| .3 | 9.6759 | 9.9447 | 9.7311 | 0.2689 | .7 |
| .4 | 9.6773 | 9.9443 | 9.7330 | 0.2670 | .6 |
| .5 | 9.6787 | 9.9439 | 9.7348 | 0.2652 | .5 |
| .6 | 9.6801 | 9.9435 | 9.7366 | 0.2634 | .4 |
| .7 | 9.6814 | 9.9431 | 9.7384 | 0.2616 | .3 |
| .8 | 9.6828 | 9.9427 | 9.7402 | 0.2598 | .2 |
| .9 | 9.6842 | 9.9422 | 9.7420 | 0.2580 | .1 |
| 29.0 | 9.6856 | 9.9418 | 9.7438 | 0.2562 | 61.0 |
| .1 | 9.6869 | 9.9414 | 9.7455 | 0.2545 | .9 |
| .2 | 9.6883 | 9.9410 | 9.7473 | 0.2527 | .8 |
| .3 | 9.6896 | 9.9406 | 9.7491 | 0.2509 | .7 |
| .4 | 9.6910 | 9.9401 | 9.7509 | 0.2491 | .6 |
| .5 | 9.6923 | 9.9397 | 9.7526 | 0.2474 | .5 |
| .6 | 9.6937 | 9.9393 | 9.7544 | 0.2456 | .4 |
| .7 | 9.6950 | 9.9388 | 9.7562 | 0.2438 | .3 |
| .8 | 9.6963 | 9.9384 | 9.7579 | 0.2421 | .2 |
| .9 | 9.6977 | 9.9380 | 9.7597 | 0.2403 | .1 |
| 30.0 | 9.6990 | 9.9375 | 9.7614 | 0.2386 | 60.0 |

| Deg. | L. Sin | L. Cos | L. Tan | L. Cot | Deg. |
|------|--------|--------|--------|--------|------|
| 30.0 | 9.6990 | 9.9375 | 9.7614 | 0.2386 | 60.0 |
| .1 | 9.7003 | 9.9371 | 9.7632 | 0.2368 | .9 |
| .2 | 9.7016 | 9.9367 | 9.7649 | 0.2351 | .8 |
| .3 | 9.7029 | 9.9362 | 9.7667 | 0.2333 | .7 |
| .4 | 9.7042 | 9.9358 | 9.7684 | 0.2316 | .6 |
| .5 | 9.7055 | 9.9353 | 9.7701 | 0.2299 | .5 |
| .6 | 9.7068 | 9.9349 | 9.7719 | 0.2281 | .4 |
| .7 | 9.7080 | 9.9344 | 9.7736 | 0.2264 | .3 |
| .8 | 9.7093 | 9.9340 | 9.7753 | 0.2247 | .2 |
| .9 | 9.7106 | 9.9335 | 9.7771 | 0.2229 | .1 |
| 31.0 | 9.7118 | 9.9331 | 9.7788 | 0.2212 | 59.0 |
| .1 | 9.7131 | 9.9326 | 9.7805 | 0.2195 | .9 |
| .2 | 9.7144 | 9.9322 | 9.7822 | 0.2178 | .8 |
| .3 | 9.7156 | 9.9317 | 9.7839 | 0.2161 | .7 |
| .4 | 9.7168 | 9.9312 | 9.7856 | 0.2144 | .6 |
| .5 | 9.7181 | 9.9308 | 9.7873 | 0.2127 | .5 |
| .6 | 9.7193 | 9.9303 | 9.7890 | 0.2110 | .4 |
| .7 | 9.7205 | 9.9298 | 9.7907 | 0.2093 | .3 |
| .8 | 9.7218 | 9.9294 | 9.7924 | 0.2076 | .2 |
| .9 | 9.7230 | 9.9289 | 9.7941 | 0.2069 | .1 |
| 32.0 | 9.7242 | 9.9284 | 9.7958 | 0.2042 | 58.0 |
| .1 | 9.7254 | 9.9279 | 9.7975 | 0.2025 | .9 |
| .2 | 9.7266 | 9.9275 | 9.7992 | 0.2008 | .8 |
| .3 | 9.7278 | 9.9270 | 9.8008 | 0.1992 | .7 |
| .4 | 9.7290 | 9.9265 | 9.8025 | 0.1975 | .6 |
| .5 | 9.7302 | 9.9260 | 9.8042 | 0.1958 | .5 |
| .6 | 9.7314 | 9.9255 | 9.8059 | 0.1941 | .4 |
| .7 | 9.7326 | 9.9251 | 9.8075 | 0.1925 | .3 |
| .8 | 9.7338 | 9.9246 | 9.8092 | 0.1908 | .2 |
| .9 | 9.7349 | 9.9241 | 9.8109 | 0.1891 | .1 |
| 33.0 | 9.7361 | 9.9236 | 9.8125 | 0.1875 | 57.0 |
| .1 | 9.7373 | 9.9231 | 9.8142 | 0.1858 | .9 |
| .2 | 9.7384 | 9.9226 | 9.8158 | 0.1842 | .8 |
| .3 | 9.7396 | 9.9221 | 9.8175 | 0.1825 | .7 |
| .4 | 9.7407 | 9.9216 | 9.8191 | 0.1809 | .6 |
| .5 | 9.7419 | 9.9211 | 9.8208 | 0.1792 | .5 |
| .6 | 9.7430 | 9.9206 | 9.8224 | 0.1776 | .4 |
| .7 | 9.7442 | 9.9201 | 9.8241 | 0.1759 | .3 |
| .8 | 9.7453 | 9.9196 | 9.8257 | 0.1743 | .2 |
| .9 | 9.7464 | 9.9191 | 9.8274 | 0.1726 | .1 |
| 34.0 | 9.7476 | 9.9186 | 9.8290 | 0.1710 | 56.0 |
| .1 | 9.7487 | 9.9181 | 9.8306 | 0.1694 | .9 |
| .2 | 9.7498 | 9.9175 | 9.8323 | 0.1677 | .8 |
| .3 | 9.7509 | 9.9170 | 9.8339 | 0.1661 | .7 |
| .4 | 9.7520 | 9.9165 | 9.8355 | 0.1645 | .6 |
| .5 | 9.7531 | 9.9160 | 9.8371 | 0.1629 | .5 |
| .6 | 9.7542 | 9.9155 | 9.8388 | 0.1612 | .4 |
| .7 | 9.7553 | 9.9149 | 9.8404 | 0.1596 | .3 |
| .8 | 9.7564 | 9.9144 | 9.8420 | 0.1580 | .2 |
| .9 | 9.7575 | 9.9139 | 9.8436 | 0.1564 | .1 |
| 35.0 | 9.7586 | 9.9134 | 9.8452 | 0.1548 | 55.0 |
| .1 | 9.7597 | 9.9128 | 9.8468 | 0.1532 | .9 |
| .2 | 9.7607 | 9.9123 | 9.8484 | 0.1516 | .8 |
| .3 | 9.7618 | 9.9118 | 9.8501 | 0.1499 | .7 |
| .4 | 9.7629 | 9.9112 | 9.8517 | 0.1483 | .6 |
| .5 | 9.7640 | 9.9107 | 9.8533 | 0.1467 | .5 |
| .6 | 9.7650 | 9.9101 | 9.8549 | 0.1451 | .4 |
| .7 | 9.7661 | 9.9096 | 9.8565 | 0.1435 | .3 |
| .8 | 9.7671 | 9.9091 | 9.8581 | 0.1419 | .2 |
| .9 | 9.7682 | 9.9085 | 9.8597 | 0.1403 | .1 |
| 36.0 | 9.7692 | 9.9080 | 9.8613 | 0.1387 | 54.0 |

| Deg. | L. Cos | L. Sin | L. Cot | L. Tan | Deg. |
|------|--------|--------|--------|--------|------|
|------|--------|--------|--------|--------|------|

| Deg. | L. Cos | L. Sin | L. Cot | L. Tan | Deg. |
|------|--------|--------|--------|--------|------|
|------|--------|--------|--------|--------|------|

LOGARITHMS OF FUNCTIONS FOR DEGREES AND DECIMALS (Continued)

| Deg. | L. Sin | L. Cos | L. Tan | L. Cot | Deg. |
|-------------|--------|--------|--------|--------|-------------|
| 36.0 | 9.7692 | 9.9080 | 9.8613 | 0.1387 | 54.0 |
| .1 | 9.7703 | 9.9074 | 9.8629 | 0.1371 | .9 |
| .2 | 9.7713 | 9.9069 | 9.8644 | 0.1356 | .8 |
| .3 | 9.7723 | 9.9063 | 9.8660 | 0.1340 | .7 |
| .4 | 9.7734 | 9.9057 | 9.8676 | 0.1324 | .6 |
| .5 | 9.7744 | 9.9052 | 9.8692 | 0.1308 | .5 |
| .6 | 9.7754 | 9.9046 | 9.8708 | 0.1292 | .4 |
| .7 | 9.7764 | 9.9041 | 9.8724 | 0.1276 | .3 |
| .8 | 9.7774 | 9.9035 | 9.8740 | 0.1260 | .2 |
| .9 | 9.7785 | 9.9029 | 9.8755 | 0.1245 | .1 |
| 37.0 | 9.7795 | 9.9023 | 9.8771 | 0.1229 | 53.0 |
| .1 | 9.7805 | 9.9018 | 9.8787 | 0.1213 | .9 |
| .2 | 9.7815 | 9.9012 | 9.8803 | 0.1197 | .8 |
| .3 | 9.7825 | 9.9006 | 9.8818 | 0.1182 | .7 |
| .4 | 9.7835 | 9.9000 | 9.8834 | 0.1166 | .6 |
| .5 | 9.7844 | 9.8995 | 9.8850 | 0.1150 | .5 |
| .6 | 9.7854 | 9.8989 | 9.8865 | 0.1135 | .4 |
| .7 | 9.7864 | 9.8983 | 9.8881 | 0.1119 | .3 |
| .8 | 9.7874 | 9.8977 | 9.8897 | 0.1103 | .2 |
| .9 | 9.7884 | 9.8971 | 9.8912 | 0.1088 | .1 |
| 38.0 | 9.7893 | 9.8965 | 9.8928 | 0.1072 | 52.0 |
| .1 | 9.7903 | 9.8959 | 9.8944 | 0.1056 | .9 |
| .2 | 9.7913 | 9.8953 | 9.8959 | 0.1041 | .8 |
| .3 | 9.7922 | 9.8947 | 9.8975 | 0.1025 | .7 |
| .4 | 9.7932 | 9.8941 | 9.8990 | 0.1010 | .6 |
| .5 | 9.7941 | 9.8935 | 9.9006 | 0.0994 | .5 |
| .6 | 9.7951 | 9.8929 | 9.9022 | 0.0978 | .4 |
| .7 | 9.7960 | 9.8923 | 9.9037 | 0.0963 | .3 |
| .8 | 9.7970 | 9.8917 | 9.9053 | 0.0947 | .2 |
| .9 | 9.7979 | 9.8911 | 9.9068 | 0.0932 | .1 |
| 39.0 | 9.7989 | 9.8905 | 9.9084 | 0.0916 | 51.0 |
| .1 | 9.7998 | 9.8899 | 9.9099 | 0.0901 | .9 |
| .2 | 9.8007 | 9.8893 | 9.9115 | 0.0885 | .8 |
| .3 | 9.8017 | 9.8887 | 9.9130 | 0.0870 | .7 |
| .4 | 9.8026 | 9.8880 | 9.9146 | 0.0854 | .6 |
| .5 | 9.8035 | 9.8874 | 9.9161 | 0.0839 | .5 |
| .6 | 9.8044 | 9.8868 | 9.9176 | 0.0824 | .4 |
| .7 | 9.8053 | 9.8862 | 9.9192 | 0.0808 | .3 |
| .8 | 9.8063 | 9.8855 | 9.9207 | 0.0793 | .2 |
| .9 | 9.8072 | 9.8849 | 9.9223 | 0.0777 | .1 |
| 40.0 | 9.8081 | 9.8843 | 9.9238 | 0.0762 | 50.0 |
| .1 | 9.8090 | 9.8836 | 9.9254 | 0.0746 | .9 |
| .2 | 9.8099 | 9.8830 | 9.9269 | 0.0731 | .8 |
| .3 | 9.8108 | 9.8823 | 9.9284 | 0.0716 | .7 |
| .4 | 9.8117 | 9.8817 | 9.9300 | 0.0700 | .6 |
| .5 | 9.8125 | 9.8810 | 9.9315 | 0.0685 | .5 |
| .6 | 9.8134 | 9.8804 | 9.9330 | 0.0670 | .4 |
| .7 | 9.8143 | 9.8797 | 9.9346 | 0.0654 | .3 |
| .8 | 9.8152 | 9.8791 | 9.9361 | 0.0639 | .2 |
| .9 | 9.8161 | 9.8784 | 9.9376 | 0.0624 | .1 |
| 41.0 | 9.8169 | 9.8778 | 9.9392 | 0.0608 | 49.0 |
| Deg. | L. Cos | L. Sin | L. Cot | L. Tan | Deg. |

| Deg. | L. Sin | L. Cos | L. Tan | L. Cot | Deg. |
|-------------|--------|--------|--------|--------|-------------|
| 41.0 | 9.8169 | 9.8778 | 9.9392 | 0.0608 | 49.0 |
| .1 | 9.8178 | 9.8771 | 9.9407 | 0.0593 | .9 |
| .2 | 9.8187 | 9.8765 | 9.9422 | 0.0578 | .8 |
| .3 | 9.8195 | 9.8758 | 9.9438 | 0.0562 | .7 |
| .4 | 9.8204 | 9.8751 | 9.9453 | 0.0547 | .6 |
| .5 | 9.8213 | 9.8745 | 9.9468 | 0.0532 | .5 |
| .6 | 9.8221 | 9.8738 | 9.9483 | 0.0517 | .4 |
| .7 | 9.8230 | 9.8731 | 9.9499 | 0.0501 | .3 |
| .8 | 9.8238 | 9.8724 | 9.9514 | 0.0486 | .2 |
| .9 | 9.8247 | 9.8718 | 9.9529 | 0.0471 | .1 |
| 42.0 | 9.8255 | 9.8711 | 9.9544 | 0.0456 | 48.0 |
| .1 | 9.8264 | 9.8704 | 9.9560 | 0.0440 | .9 |
| .2 | 9.8272 | 9.8697 | 9.9575 | 0.0425 | .8 |
| .3 | 9.8280 | 9.8690 | 9.9590 | 0.0410 | .7 |
| .4 | 9.8289 | 9.8683 | 9.9605 | 0.0395 | .6 |
| .5 | 9.8297 | 9.8676 | 9.9621 | 0.0379 | .5 |
| .6 | 9.8305 | 9.8669 | 9.9636 | 0.0364 | .4 |
| .7 | 9.8313 | 9.8662 | 9.9651 | 0.0349 | .3 |
| .8 | 9.8322 | 9.8655 | 9.9666 | 0.0334 | .2 |
| .9 | 9.8330 | 9.8648 | 9.9681 | 0.0319 | .1 |
| 43.0 | 9.8338 | 9.8641 | 9.9697 | 0.0303 | 47.0 |
| .1 | 9.8346 | 9.8634 | 9.9712 | 0.0288 | .9 |
| .2 | 9.8354 | 9.8627 | 9.9727 | 0.0273 | .8 |
| .3 | 9.8362 | 9.8620 | 9.9742 | 0.0258 | .7 |
| .4 | 9.8370 | 9.8613 | 9.9757 | 0.0243 | .6 |
| .5 | 9.8378 | 9.8606 | 9.9772 | 0.0228 | .5 |
| .6 | 9.8386 | 9.8598 | 9.9788 | 0.0212 | .4 |
| .7 | 9.8394 | 9.8591 | 9.9803 | 0.0197 | .3 |
| .8 | 9.8402 | 9.8584 | 9.9818 | 0.0182 | .2 |
| .9 | 9.8410 | 9.8577 | 9.9833 | 0.0167 | .1 |
| 44.0 | 9.8418 | 9.8569 | 9.9848 | 0.0152 | 46.0 |
| .1 | 9.8426 | 9.8562 | 9.9864 | 0.0136 | .9 |
| .2 | 9.8433 | 9.8555 | 9.9879 | 0.0121 | .8 |
| .3 | 9.8441 | 9.8547 | 9.9894 | 0.0106 | .7 |
| .4 | 9.8449 | 9.8540 | 9.9909 | 0.0091 | .6 |
| .5 | 9.8457 | 9.8532 | 9.9924 | 0.0076 | .5 |
| .6 | 9.8464 | 9.8525 | 9.9939 | 0.0061 | .4 |
| .7 | 9.8472 | 9.8517 | 9.9955 | 0.0045 | .3 |
| .8 | 9.8480 | 9.8510 | 9.9970 | 0.0030 | .2 |
| .9 | 9.8487 | 9.8502 | 9.9985 | 0.0015 | .1 |
| 45.0 | 9.8495 | 9.8495 | 0.0000 | 0.0000 | 45.0 |
| Deg. | L. Cos | L. Sin | L. Cot | L. Tan | Deg. |

NATURAL FUNCTIONS FOR ANGLES IN RADIANs

| Rad. | Sin | Tan | Cot | Cos |
|------|--------|--------|----------|--------|
| .00 | .00000 | .00000 | ∞ | 1.0000 |
| .01 | .01000 | .01000 | 99.997 | .99995 |
| .02 | .02000 | .02000 | 49.993 | .99980 |
| .03 | .03000 | .03001 | 33.323 | .99955 |
| .04 | .03999 | .04002 | 24.987 | .99920 |
| .05 | .04998 | .05004 | 19.983 | .99875 |
| .06 | .05996 | .06007 | 16.647 | .99820 |
| .07 | .06994 | .07011 | 14.262 | .99755 |
| .08 | .07991 | .08017 | 12.473 | .99680 |
| .09 | .08988 | .09024 | 11.081 | .99595 |
| .10 | .09983 | .10033 | 9.9666 | .99500 |
| .11 | .10978 | .11045 | 9.0542 | .99396 |
| .12 | .11971 | .12058 | 8.2933 | .99281 |
| .13 | .12963 | .13074 | 7.6489 | .99156 |
| .14 | .13954 | .14092 | 7.0961 | .99022 |
| .15 | .14944 | .15114 | 6.6166 | .98877 |
| .16 | .15932 | .16138 | 6.1966 | .98723 |
| .17 | .16918 | .17166 | 5.8256 | .98558 |
| .18 | .17903 | .18197 | 5.4954 | .98384 |
| .19 | .18886 | .19232 | 5.1997 | .98200 |
| .20 | .19867 | .20271 | 4.9332 | .98007 |
| .21 | .20846 | .21314 | 4.6917 | .97803 |
| .22 | .21823 | .22362 | 4.4719 | .97590 |
| .23 | .22798 | .23414 | 4.2709 | .97367 |
| .24 | .23770 | .24472 | 4.0864 | .97134 |
| .25 | .24740 | .25534 | 3.9163 | .96891 |
| .26 | .25708 | .26602 | 3.7591 | .96639 |
| .27 | .26673 | .27676 | 3.6133 | .96377 |
| .28 | .27636 | .28755 | 3.4776 | .96106 |
| .29 | .28595 | .29841 | 3.3511 | .95824 |
| .30 | .29552 | .30934 | 3.2327 | .95534 |
| .31 | .30506 | .32033 | 3.1218 | .95233 |
| .32 | .31457 | .33139 | 3.0176 | .94924 |
| .33 | .32404 | .34252 | 2.9195 | .94604 |
| .34 | .33349 | .35374 | 2.8270 | .94275 |
| .35 | .34290 | .36503 | 2.7395 | .93937 |
| .36 | .35227 | .37640 | 2.6567 | .93590 |
| .37 | .36162 | .38786 | 2.5782 | .93233 |
| .38 | .37092 | .39941 | 2.5037 | .92866 |
| .39 | .38019 | .41105 | 2.4328 | .92491 |
| .40 | .38942 | .42279 | 2.3652 | .92106 |
| .41 | .39861 | .43463 | 2.3008 | .91712 |
| .42 | .40776 | .44657 | 2.2393 | .91309 |
| .43 | .41687 | .45862 | 2.1804 | .90897 |
| .44 | .42594 | .47078 | 2.1241 | .90475 |
| .45 | .43497 | .48306 | 2.0702 | .90045 |
| .46 | .44395 | .49545 | 2.0184 | .89605 |
| .47 | .45289 | .50797 | 1.9686 | .89157 |
| .48 | .46178 | .52061 | 1.9208 | .88699 |
| .49 | .47063 | .53339 | 1.8748 | .88233 |
| .50 | .47943 | .54630 | 1.8305 | .87758 |
| Rad. | Sin | Tan | Cot | Cos |

| Rad. | Sin | Tan | Cot | Cos |
|------|--------|--------|--------|--------|
| .50 | .47943 | .54630 | 1.8305 | .87758 |
| .51 | .48818 | .55936 | 1.7878 | .87274 |
| .52 | .49688 | .57256 | 1.7465 | .86782 |
| .53 | .50553 | .58592 | 1.7067 | .86281 |
| .54 | .51414 | .59943 | 1.6683 | .85771 |
| .55 | .52269 | .61311 | 1.6310 | .85252 |
| .56 | .53119 | .62695 | 1.5950 | .84726 |
| .57 | .53963 | .64097 | 1.5601 | .84190 |
| .58 | .54802 | .65517 | 1.5263 | .83646 |
| .59 | .55636 | .66956 | 1.4935 | .83094 |
| .60 | .56464 | .68414 | 1.4617 | .82534 |
| .61 | .57287 | .69892 | 1.4308 | .81965 |
| .62 | .58104 | .71391 | 1.4007 | .81388 |
| .63 | .58914 | .72911 | 1.3715 | .80803 |
| .64 | .59720 | .74454 | 1.3431 | .80210 |
| .65 | .60519 | .76020 | 1.3154 | .79608 |
| .66 | .61312 | .77610 | 1.2885 | .78999 |
| .67 | .62099 | .79225 | 1.2622 | .78382 |
| .68 | .62879 | .80866 | 1.2366 | .77757 |
| .69 | .63654 | .82534 | 1.2116 | .77125 |
| .70 | .64422 | .84229 | 1.1872 | .76484 |
| .71 | .65183 | .85953 | 1.1634 | .75836 |
| .72 | .65938 | .87707 | 1.1402 | .75181 |
| .73 | .66687 | .89492 | 1.1174 | .74517 |
| .74 | .67429 | .91309 | 1.0952 | .73847 |
| .75 | .68164 | .93160 | 1.0734 | .73169 |
| .76 | .68892 | .95045 | 1.0521 | .72484 |
| .77 | .69614 | .96967 | 1.0313 | .71791 |
| .78 | .70328 | .98926 | 1.0109 | .71091 |
| .79 | .71035 | 1.0092 | .99084 | .70385 |
| .80 | .71736 | 1.0296 | .97121 | .69671 |
| .81 | .72429 | 1.0505 | .95197 | .68950 |
| .82 | .73115 | 1.0717 | .93309 | .68222 |
| .83 | .73793 | 1.0934 | .91455 | .67488 |
| .84 | .74464 | 1.1156 | .89635 | .66746 |
| .85 | .75128 | 1.1383 | .87848 | .65998 |
| .86 | .75784 | 1.1616 | .86091 | .65244 |
| .87 | .76433 | 1.1853 | .84365 | .64483 |
| .88 | .77074 | 1.2097 | .82668 | .63715 |
| .89 | .77707 | 1.2346 | .80998 | .62941 |
| .90 | .78333 | 1.2602 | .79355 | .62161 |
| .91 | .78950 | 1.2864 | .77738 | .61375 |
| .92 | .79560 | 1.3133 | .76146 | .60582 |
| .93 | .80162 | 1.3409 | .74578 | .59783 |
| .94 | .80756 | 1.3692 | .73034 | .58979 |
| .95 | .81342 | 1.3984 | .71511 | .58168 |
| .96 | .81919 | 1.4284 | .70010 | .57352 |
| .97 | .82489 | 1.4592 | .68531 | .56530 |
| .98 | .83050 | 1.4910 | .67071 | .55702 |
| .99 | .83603 | 1.5237 | .65631 | .54869 |
| 1.00 | .84147 | 1.5574 | .64209 | .54030 |
| Rad. | Sin | Tan | Cot | Cos |

FUNCTIONS FOR ANGLES IN RADIANS (Continued)

| Rad. | Sin | Tan | Cot | Cos |
|------|--------|--------|--------|--------|
| 1.00 | .84147 | 1.5574 | .64209 | .54030 |
| 1.01 | .84683 | 1.5922 | .62806 | .53186 |
| 1.02 | .85211 | 1.6281 | .61420 | .52337 |
| 1.03 | .85730 | 1.6652 | .60051 | .51482 |
| 1.04 | .86240 | 1.7036 | .58699 | .50622 |
| 1.05 | .86742 | 1.7433 | .57362 | .49757 |
| 1.06 | .87236 | 1.7844 | .56046 | .48887 |
| 1.07 | .87720 | 1.8270 | .54734 | .48012 |
| 1.08 | .88196 | 1.8712 | .53441 | .47133 |
| 1.09 | .88663 | 1.9171 | .52162 | .46249 |
| 1.10 | .89121 | 1.9648 | .50897 | .45360 |
| 1.11 | .89570 | 2.0143 | .49644 | .44466 |
| 1.12 | .90010 | 2.0660 | .48404 | .43568 |
| 1.13 | .90441 | 2.1198 | .47175 | .42666 |
| 1.14 | .90863 | 2.1759 | .45959 | .41759 |
| 1.15 | .91276 | 2.2345 | .44753 | .40849 |
| 1.16 | .91680 | 2.2958 | .43558 | .39934 |
| 1.17 | .92075 | 2.3600 | .42373 | .39015 |
| 1.18 | .92461 | 2.4273 | .41199 | .38092 |
| 1.19 | .92837 | 2.4979 | .40034 | .37166 |
| 1.20 | .93204 | 2.5722 | .38878 | .36236 |
| 1.21 | .93562 | 2.6503 | .37731 | .35302 |
| 1.22 | .93910 | 2.7328 | .36593 | .34365 |
| 1.23 | .94249 | 2.8198 | .35463 | .33424 |
| 1.24 | .94578 | 2.9119 | .34341 | .32480 |
| 1.25 | .94898 | 3.0096 | .33227 | .31532 |
| 1.26 | .95209 | 3.1133 | .32121 | .30582 |
| 1.27 | .95510 | 3.2236 | .31021 | .29628 |
| 1.28 | .95802 | 3.3413 | .29928 | .28672 |
| 1.29 | .96084 | 3.4672 | .28842 | .27712 |
| 1.30 | .96356 | 3.6021 | .27762 | .26750 |
| 1.31 | .96618 | 3.7471 | .26687 | .25785 |
| 1.32 | .96872 | 3.9033 | .25619 | .24818 |
| 1.33 | .97115 | 4.0723 | .24556 | .23848 |
| 1.34 | .97348 | 4.2556 | .23498 | .22875 |
| 1.35 | .97572 | 4.4552 | .22446 | .21901 |
| 1.36 | .97786 | 4.6734 | .21398 | .20924 |
| 1.37 | .97991 | 4.9131 | .20354 | .19945 |
| 1.38 | .98185 | 5.1774 | .19315 | .18964 |
| 1.39 | .98370 | 5.4707 | .18279 | .17981 |
| 1.40 | .98545 | 5.7979 | .17248 | .16997 |
| 1.41 | .98710 | 6.1654 | .16220 | .16010 |
| 1.42 | .98865 | 6.5811 | .15195 | .15023 |
| 1.43 | .99010 | 7.0555 | .14173 | .14033 |
| 1.44 | .99146 | 7.6018 | .13155 | .13042 |
| 1.45 | .99271 | 8.2381 | .12139 | .12050 |
| 1.46 | .99387 | 8.9886 | .11125 | .11057 |
| 1.47 | .99492 | 9.8874 | .10114 | .10063 |
| 1.48 | .99588 | 10.983 | .09105 | .09067 |
| 1.49 | .99674 | 12.350 | .08097 | .08071 |
| 1.50 | .99749 | 14.101 | .07091 | .07074 |

| Rad. | Sin | Tan | Cot | Cos |
|------|--------|---------|---------|---------|
| 1.50 | .99749 | 14.101 | .07091 | .07074 |
| 1.51 | .99815 | 16.428 | .06087 | .06076 |
| 1.52 | .99871 | 19.670 | .05084 | .05077 |
| 1.53 | .99917 | 24.498 | .04082 | .04079 |
| 1.54 | .99953 | 32.461 | .03081 | .03079 |
| 1.55 | .99978 | 48.078 | .02080 | .02079 |
| 1.56 | .99994 | 92.621 | .01080 | .01080 |
| 1.57 | 1.0000 | 1255.8 | .00080 | .00080 |
| 1.58 | .99996 | -108.65 | -.00920 | -.00920 |
| 1.59 | .99982 | -52.067 | -.01921 | -.01920 |
| 1.60 | .99957 | -34.233 | -.02921 | -.02920 |
| 1.61 | .99923 | -25.495 | -.03922 | -.03919 |
| 1.62 | .99879 | -20.307 | -.04924 | -.04918 |
| 1.63 | .99825 | -16.871 | -.05927 | -.05917 |
| 1.64 | .99761 | -14.427 | -.06931 | -.06915 |
| 1.65 | .99687 | -12.599 | -.07937 | -.07912 |
| 1.66 | .99602 | -11.181 | -.08944 | -.08909 |
| 1.67 | .99508 | -10.047 | -.09953 | -.09904 |
| 1.68 | .99404 | -9.1208 | -.10964 | -.10899 |
| 1.69 | .99290 | -8.3492 | -.11977 | -.11892 |
| 1.70 | .99166 | -7.6966 | -.12993 | -.12884 |
| 1.71 | .99033 | -7.1373 | -.14011 | -.13875 |
| 1.72 | .98889 | -6.6524 | -.15032 | -.14865 |
| 1.73 | .98735 | -6.2281 | -.16056 | -.15853 |
| 1.74 | .98572 | -5.8535 | -.17084 | -.16840 |
| 1.75 | .98399 | -5.5204 | -.18115 | -.17825 |
| 1.76 | .98215 | -5.2221 | -.19149 | -.18808 |
| 1.77 | .98022 | -4.9534 | -.20188 | -.19789 |
| 1.78 | .97820 | -4.7101 | -.21231 | -.20768 |
| 1.79 | .97607 | -4.4887 | -.22278 | -.21745 |
| 1.80 | .97385 | -4.2863 | -.23330 | -.22720 |
| 1.81 | .97153 | -4.1005 | -.24387 | -.23693 |
| 1.82 | .96911 | -3.9294 | -.25449 | -.24663 |
| 1.83 | .96659 | -3.7712 | -.26517 | -.25631 |
| 1.84 | .96398 | -3.6245 | -.27590 | -.26596 |
| 1.85 | .96128 | -3.4881 | -.28669 | -.27559 |
| 1.86 | .95847 | -3.3608 | -.29755 | -.28519 |
| 1.87 | .95557 | -3.2419 | -.30846 | -.29476 |
| 1.88 | .95258 | -3.1304 | -.31945 | -.30430 |
| 1.89 | .94949 | -3.0257 | -.33051 | -.31381 |
| 1.90 | .94630 | -2.9271 | -.34164 | -.32329 |
| 1.91 | .94302 | -2.8341 | -.35284 | -.33274 |
| 1.92 | .93965 | -2.7463 | -.36413 | -.34215 |
| 1.93 | .93618 | -2.6632 | -.37549 | -.35153 |
| 1.94 | .93262 | -2.5843 | -.38695 | -.36087 |
| 1.95 | .92896 | -2.5095 | -.39849 | -.37018 |
| 1.96 | .92521 | -2.4383 | -.41012 | -.37945 |
| 1.97 | .92137 | -2.3705 | -.42185 | -.38868 |
| 1.98 | .91744 | -2.3058 | -.43368 | -.39788 |
| 1.99 | .91341 | -2.2441 | -.44562 | -.40703 |
| 2.00 | .90930 | -2.1850 | -.45766 | -.41615 |

| Rad. | Sin | Tan | Cot | Cos |
|------|-----|-----|-----|-----|
|------|-----|-----|-----|-----|

LOGARITHMS OF THE FUNCTIONS FOR ANGLES IN RADIANS

| Rad. | L. Sin | L. Tan | L. Cot | L. Cos |
|------|---------|---------|---------|---------|
| .00 | - ∞ | - ∞ | ∞ | 0.00000 |
| .01 | 7.99999 | 8.00001 | 1.99999 | 9.99998 |
| .02 | 8.30100 | 8.30100 | 1.69891 | 9.09991 |
| .03 | 8.47706 | 8.47725 | 1.52275 | 9.99980 |
| .04 | 8.60194 | 8.60229 | 1.39771 | 9.99965 |
| .05 | 8.69879 | 8.69933 | 1.30067 | 9.99946 |
| .06 | 8.77789 | 8.77867 | 1.22133 | 9.99922 |
| .07 | 8.84474 | 8.84581 | 1.15419 | 9.99894 |
| .08 | 8.90263 | 8.90402 | 1.09598 | 9.99861 |
| .09 | 8.95366 | 8.95542 | 1.04458 | 9.99824 |
| .10 | 8.99928 | 9.00145 | 0.99855 | 9.99782 |
| .11 | 9.04052 | 9.04315 | 0.95685 | 9.99737 |
| .12 | 9.07814 | 9.08127 | 0.91873 | 9.99687 |
| .13 | 9.11272 | 9.11640 | 0.88360 | 9.99632 |
| .14 | 9.14471 | 9.14898 | 0.85102 | 9.99573 |
| .15 | 9.17446 | 9.17937 | 0.82063 | 9.99510 |
| .16 | 9.20227 | 9.20785 | 0.79215 | 9.99442 |
| .17 | 9.22835 | 9.23466 | 0.76534 | 9.99369 |
| .18 | 9.25292 | 9.26000 | 0.74000 | 9.99293 |
| .19 | 9.27614 | 9.28402 | 0.71598 | 9.99211 |
| .20 | 9.29813 | 9.30688 | 0.69312 | 9.99126 |
| .21 | 9.31902 | 9.32867 | 0.67133 | 9.99035 |
| .22 | 9.33891 | 9.34951 | 0.65049 | 9.98940 |
| .23 | 9.35789 | 9.36948 | 0.63052 | 9.98841 |
| .24 | 9.37603 | 9.38866 | 0.61134 | 9.98737 |
| .25 | 9.39341 | 9.40712 | 0.59288 | 9.98628 |
| .26 | 9.41007 | 9.42492 | 0.57508 | 9.98515 |
| .27 | 9.42607 | 9.44210 | 0.55790 | 9.98397 |
| .28 | 9.44147 | 9.45872 | 0.54128 | 9.98275 |
| .29 | 9.45629 | 9.47482 | 0.52518 | 9.98148 |
| .30 | 9.47059 | 9.49043 | 0.50957 | 9.98016 |
| .31 | 9.48438 | 9.50559 | 0.49441 | 9.97879 |
| .32 | 9.49771 | 9.52034 | 0.47966 | 9.97737 |
| .33 | 9.51060 | 9.53469 | 0.46531 | 9.97591 |
| .34 | 9.52308 | 9.54868 | 0.45132 | 9.97440 |
| .35 | 9.53516 | 9.56233 | 0.43767 | 9.97284 |
| .36 | 9.54688 | 9.57565 | 0.42435 | 9.97123 |
| .37 | 9.55825 | 9.58868 | 0.41132 | 9.96957 |
| .38 | 9.56928 | 9.60142 | 0.39858 | 9.96786 |
| .39 | 9.58000 | 9.61390 | 0.38610 | 9.96610 |
| .40 | 9.59042 | 9.62613 | 0.37387 | 9.96429 |
| .41 | 9.60055 | 9.63812 | 0.36188 | 9.96243 |
| .42 | 9.61041 | 9.64989 | 0.35011 | 9.96051 |
| .43 | 9.62000 | 9.66145 | 0.33855 | 9.95855 |
| .44 | 9.62935 | 9.67282 | 0.32718 | 9.95653 |
| .45 | 9.63845 | 9.68400 | 0.31600 | 9.95446 |
| .46 | 9.64733 | 9.69500 | 0.30500 | 9.95233 |
| .47 | 9.65599 | 9.70583 | 0.29417 | 9.95015 |
| .48 | 9.66443 | 9.71651 | 0.28349 | 9.94792 |
| .49 | 9.67268 | 9.72704 | 0.27296 | 9.94563 |
| .50 | 9.68072 | 9.73743 | 0.26257 | 9.94329 |
| Rad. | L. Sin | L. Tan | L. Cot | L. Cos |

| Rad. | L. Sin | L. Tan | L. Cot | L. Cos |
|------|---------|---------|---------|---------|
| .50 | 9.68072 | 9.73743 | 0.26257 | 9.94329 |
| .51 | 9.68858 | 9.74769 | 0.25231 | 9.94089 |
| .52 | 9.69625 | 9.75782 | 0.24218 | 9.93843 |
| .53 | 9.70375 | 9.76784 | 0.23216 | 9.93591 |
| .54 | 9.71108 | 9.77774 | 0.22226 | 9.93334 |
| .55 | 9.71824 | 9.78754 | 0.21246 | 9.93071 |
| .56 | 9.72525 | 9.79723 | 0.20277 | 9.92801 |
| .57 | 9.73210 | 9.80684 | 0.19316 | 9.92526 |
| .58 | 9.73880 | 9.81635 | 0.18365 | 9.92245 |
| .59 | 9.74536 | 9.82579 | 0.17421 | 9.91957 |
| .60 | 9.75177 | 9.83514 | 0.16486 | 9.91663 |
| .61 | 9.75805 | 9.84443 | 0.15557 | 9.91363 |
| .62 | 9.76420 | 9.85364 | 0.14636 | 9.91056 |
| .63 | 9.77022 | 9.86280 | 0.13720 | 9.90743 |
| .64 | 9.77612 | 9.87189 | 0.12811 | 9.90423 |
| .65 | 9.78189 | 9.88093 | 0.11907 | 9.90096 |
| .66 | 9.78754 | 9.88992 | 0.11008 | 9.89762 |
| .67 | 9.79308 | 9.89886 | 0.10114 | 9.89422 |
| .68 | 9.79851 | 9.90777 | 0.09223 | 9.89074 |
| .69 | 9.80382 | 9.91663 | 0.08337 | 9.88719 |
| .70 | 9.80903 | 9.92546 | 0.07454 | 9.88357 |
| .71 | 9.81414 | 9.93426 | 0.06574 | 9.87988 |
| .72 | 9.81914 | 9.94303 | 0.05697 | 9.87611 |
| .73 | 9.82404 | 9.95178 | 0.04822 | 9.87226 |
| .74 | 9.82885 | 9.96051 | 0.03949 | 9.86833 |
| .75 | 9.83355 | 9.96923 | 0.03077 | 9.86433 |
| .76 | 9.83817 | 9.97793 | 0.02207 | 9.86024 |
| .77 | 9.84269 | 9.98662 | 0.01338 | 9.85607 |
| .78 | 9.84713 | 9.99531 | 0.00469 | 9.85182 |
| .79 | 9.85147 | 0.00400 | 9.99600 | 9.84748 |
| .80 | 9.85573 | 0.01268 | 9.98732 | 9.84306 |
| .81 | 9.85991 | 0.02138 | 9.97862 | 9.83853 |
| .82 | 9.86400 | 0.03008 | 9.96992 | 9.83393 |
| .83 | 9.86802 | 0.03879 | 9.96121 | 9.82922 |
| .84 | 9.87195 | 0.04752 | 9.95248 | 9.82443 |
| .85 | 9.87580 | 0.05627 | 9.94373 | 9.81953 |
| .86 | 9.87958 | 0.06504 | 9.93496 | 9.81454 |
| .87 | 9.88328 | 0.07384 | 9.92616 | 9.80944 |
| .88 | 9.88691 | 0.08266 | 9.91734 | 9.80424 |
| .89 | 9.89046 | 0.09153 | 9.90847 | 9.79894 |
| .90 | 9.89394 | 0.10043 | 9.89957 | 9.79352 |
| .91 | 9.89735 | 0.10937 | 9.89063 | 9.78799 |
| .92 | 9.90070 | 0.11835 | 9.88165 | 9.78234 |
| .93 | 9.90397 | 0.12739 | 9.87261 | 9.77658 |
| .94 | 9.90717 | 0.13648 | 9.86352 | 9.77070 |
| .95 | 9.91031 | 0.14563 | 9.85437 | 9.76469 |
| .96 | 9.91339 | 0.15484 | 9.84516 | 9.75856 |
| .97 | 9.91639 | 0.16412 | 9.83588 | 9.75228 |
| .98 | 9.91934 | 0.17347 | 9.82653 | 9.74587 |
| .99 | 9.92222 | 0.18289 | 9.81711 | 9.73933 |
| 1.00 | 9.92504 | 0.19240 | 9.80760 | 9.73264 |
| Rad. | L. Sin | L. Tan | L. Cot | L. Cos |

LOGARITHMS OF FUNCTIONS FOR ANGLES IN RADIANS (Continued)

| Rad. | L. Sin | L. Tan | L. Cot | L. Cos |
|-------------|---------|---------|---------|--------|
| 1.009.92504 | 0.19240 | 9.80760 | 9.73264 | |
| 1.019.92780 | 0.20200 | 9.79800 | 9.72580 | |
| 1.029.93049 | 0.21169 | 9.78831 | 9.71881 | |
| 1.039.93313 | 0.22148 | 9.77852 | 9.71165 | |
| 1.049.93571 | 0.23137 | 9.76863 | 9.70434 | |
| 1.059.93823 | 0.24138 | 9.75862 | 9.69686 | |
| 1.069.94069 | 0.25150 | 9.74850 | 9.68920 | |
| 1.079.94310 | 0.26175 | 9.73825 | 9.68135 | |
| 1.089.94545 | 0.27212 | 9.72788 | 9.67332 | |
| 1.099.94774 | 0.28264 | 9.71736 | 9.66510 | |
| 1.109.94998 | 0.29331 | 9.70669 | 9.65667 | |
| 1.119.95216 | 0.30413 | 9.69587 | 9.64803 | |
| 1.129.95429 | 0.31512 | 9.68488 | 9.63917 | |
| 1.139.95637 | 0.32628 | 9.67372 | 9.63008 | |
| 1.149.95839 | 0.33763 | 9.66237 | 9.62075 | |
| 1.159.96036 | 0.34918 | 9.65082 | 9.61118 | |
| 1.169.96228 | 0.36093 | 9.63907 | 9.60134 | |
| 1.179.96414 | 0.37291 | 9.62709 | 9.59123 | |
| 1.189.96596 | 0.38512 | 9.61488 | 9.58084 | |
| 1.199.96772 | 0.39757 | 9.60243 | 9.57015 | |
| 1.209.96943 | 0.41030 | 9.58970 | 9.55914 | |
| 1.219.97110 | 0.42330 | 9.57670 | 9.54780 | |
| 1.229.97271 | 0.43660 | 9.56340 | 9.53611 | |
| 1.239.97428 | 0.45022 | 9.54978 | 9.52406 | |
| 1.249.97579 | 0.46418 | 9.53582 | 9.51161 | |
| 1.259.97726 | 0.47850 | 9.52150 | 9.49875 | |
| 1.269.97868 | 0.49322 | 9.50678 | 9.48546 | |
| 1.279.98005 | 0.50835 | 9.49165 | 9.47170 | |
| 1.289.98137 | 0.52392 | 9.47608 | 9.45745 | |
| 1.299.98265 | 0.53998 | 9.46002 | 9.44267 | |
| 1.309.98388 | 0.55656 | 9.44344 | 9.42732 | |
| 1.319.98506 | 0.57369 | 9.42631 | 9.41137 | |
| 1.329.98620 | 0.59144 | 9.40856 | 9.39476 | |
| 1.339.98729 | 0.60984 | 9.39016 | 9.37744 | |
| 1.349.98833 | 0.62896 | 9.37104 | 9.35937 | |
| 1.359.98933 | 0.64887 | 9.35113 | 9.34046 | |
| 1.369.99028 | 0.66964 | 9.33036 | 9.32064 | |
| 1.379.99119 | 0.69135 | 9.30865 | 9.29983 | |
| 1.389.99205 | 0.71411 | 9.28589 | 9.27793 | |
| 1.399.99286 | 0.73804 | 9.26196 | 9.25482 | |
| 1.409.99363 | 0.76327 | 9.23673 | 9.23036 | |
| 1.419.99436 | 0.78996 | 9.21004 | 9.20440 | |
| 1.429.99504 | 0.81830 | 9.18170 | 9.17674 | |
| 1.439.99568 | 0.84853 | 9.15147 | 9.14716 | |
| 1.449.99627 | 0.88092 | 9.11908 | 9.11536 | |
| 1.459.99682 | 0.91583 | 9.08417 | 9.08100 | |
| 1.469.99733 | 0.95369 | 9.04631 | 9.04364 | |
| 1.479.99779 | 0.99508 | 9.00492 | 9.00271 | |
| 1.489.99821 | 1.04074 | 8.95926 | 8.95747 | |
| 1.499.99858 | 1.09166 | 8.90834 | 8.90692 | |
| 1.509.99891 | 1.14926 | 8.85074 | 8.84965 | |
| Rad. | L. Sin | L. Tan | L. Cot | L. Cos |

| Rad. | L. Sin | L. Tan | L. Cot | L. Cos |
|-------------|---------|---------|---------|--------|
| 1.509.99891 | 1.14926 | 8.85074 | 8.84965 | |
| 1.519.99920 | 1.21559 | 8.78441 | 8.78361 | |
| 1.529.99944 | 1.29379 | 8.70621 | 8.70565 | |
| 1.539.99964 | 1.38914 | 8.61086 | 8.61050 | |
| 1.549.99979 | 1.51136 | 8.48864 | 8.48843 | |
| 1.559.99991 | 1.68195 | 8.31805 | 8.31796 | |
| 1.569.99997 | 1.96671 | 8.03329 | 8.03327 | |
| 1.570.00000 | 3.09891 | 6.90109 | 6.90109 | |
| 1.589.99998 | 2.03603 | 7.96397 | 7.96396 | |
| 1.599.99992 | 1.71656 | 8.28344 | 8.28336 | |
| 1.609.99981 | 1.53444 | 8.46556 | 8.46538 | |
| 1.619.99967 | 1.40645 | 8.59355 | 8.59323 | |
| 1.629.99947 | 1.30765 | 8.69235 | 8.69182 | |
| 1.639.99924 | 1.22714 | 8.77286 | 8.77209 | |
| 1.649.99896 | 1.15918 | 8.84082 | 8.83974 | |
| 1.659.99864 | 1.10035 | 8.89965 | 8.89829 | |
| 1.669.99827 | 1.04847 | 8.95154 | 8.94981 | |
| 1.679.99786 | 1.00204 | 8.99796 | 8.99583 | |
| 1.689.99741 | 0.96003 | 9.03997 | 9.03737 | |
| 1.699.99691 | 0.92165 | 9.07835 | 9.07526 | |
| 1.709.99636 | 0.88630 | 9.11370 | 9.11007 | |
| 1.719.99578 | 0.85353 | 9.14647 | 9.14225 | |
| 1.729.99515 | 0.82298 | 9.17702 | 9.17217 | |
| 1.739.99447 | 0.79436 | 9.20564 | 9.20012 | |
| 1.749.99375 | 0.76742 | 9.23258 | 9.22634 | |
| 1.759.99299 | 0.74197 | 9.25803 | 9.25102 | |
| 1.769.99218 | 0.71784 | 9.28216 | 9.27434 | |
| 1.779.99133 | 0.69490 | 9.30510 | 9.29642 | |
| 1.789.99043 | 0.67303 | 9.32697 | 9.31740 | |
| 1.799.98948 | 0.65212 | 9.34789 | 9.33736 | |
| 1.809.98849 | 0.63208 | 9.36792 | 9.35641 | |
| 1.819.98745 | 0.61284 | 9.38716 | 9.37462 | |
| 1.829.98637 | 0.59432 | 9.40568 | 9.39205 | |
| 1.839.98524 | 0.57648 | 9.42352 | 9.40877 | |
| 1.849.98407 | 0.55925 | 9.44075 | 9.42483 | |
| 1.859.98285 | 0.54258 | 9.45742 | 9.44026 | |
| 1.869.98158 | 0.52645 | 9.47355 | 9.45513 | |
| 1.879.98026 | 0.51080 | 9.48920 | 9.46947 | |
| 1.889.97890 | 0.49560 | 9.50440 | 9.48330 | |
| 1.899.97749 | 0.48082 | 9.51918 | 9.49667 | |
| 1.909.97603 | 0.46644 | 9.53356 | 9.50959 | |
| 1.919.97452 | 0.45242 | 9.54758 | 9.52210 | |
| 1.929.97296 | 0.43875 | 9.56125 | 9.53422 | |
| 1.939.97136 | 0.42540 | 9.57460 | 9.54597 | |
| 1.949.96970 | 0.41235 | 9.58765 | 9.55735 | |
| 1.959.96800 | 0.39958 | 9.60042 | 9.56841 | |
| 1.969.96624 | 0.38708 | 9.61292 | 9.57916 | |
| 1.979.96443 | 0.37484 | 9.62516 | 9.58960 | |
| 1.989.96258 | 0.36283 | 9.63717 | 9.59975 | |
| 1.999.96067 | 0.35104 | 9.64896 | 9.60963 | |
| 2.009.95871 | 0.33946 | 9.66054 | 9.61925 | |
| Rad. | L. Sin | L. Tan | L. Cot | L. Cos |

* Values of the cosine, tangent and cotangent for angles in the table, 1.58 radians and above, are negative.

HAVERSINES

The following table gives the values of the haversines and their logarithms for angles from 0 to 180° at 10 minute intervals. Characteristics of the logarithms are omitted.

| ° | 0' | | 10' | | 20' | | 30' | | 40' | | 50' | |
|----|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|
| | Value | Log | Value | Log | Value | Log | Value | Log | Value | Log | Value | Log |
| 0 | .0000 | — | .0000 | 6.3254 | .0000 | 6.9275 | .0000 | 5.2796 | .0000 | 5.5295 | .0001 | 5.7233 |
| 1 | .0001 | 5.8817 | .0001 | .0156 | .0001 | .1316 | .0002 | .2339 | .0002 | .3254 | .0003 | .4081 |
| 2 | .0003 | .4837 | .0004 | .5532 | .0004 | .6176 | .0005 | .6775 | .0005 | .7336 | .0006 | .7862 |
| 3 | .0007 | .8358 | .0008 | .8828 | .0008 | .9273 | .0009 | .9697 | .0010 | .10101 | .0011 | .10487 |
| 4 | .0012 | .10856 | .0013 | .1211 | .0014 | .1551 | .0015 | .1879 | .0017 | .2195 | .0018 | .2499 |
| 5 | .0019 | .2794 | .0020 | .3078 | .0022 | .3354 | .0023 | .3621 | .0024 | .3880 | .0026 | .4132 |
| 6 | .0027 | .4376 | .0029 | .4614 | .0031 | .4845 | .0032 | .5071 | .0034 | .5290 | .0036 | .5504 |
| 7 | .0037 | .5714 | .0039 | .5918 | .0041 | .6117 | .0043 | .6312 | .0045 | .6503 | .0047 | .6689 |
| 8 | .0049 | .6872 | .0051 | .7051 | .0053 | .7226 | .0055 | .7397 | .0057 | .7566 | .0059 | .7731 |
| 9 | .0062 | .7893 | .0064 | .8052 | .0066 | .8208 | .0069 | .8361 | .0071 | .8512 | .0073 | .8660 |
| 10 | .0076 | .8806 | .0079 | .8949 | .0081 | .9090 | .0084 | .9229 | .0086 | .9365 | .0089 | .9499 |
| 11 | .0092 | .9631 | .0095 | .9762 | .0097 | .9890 | .0100 | .10016 | .0103 | .10141 | .0106 | .10264 |
| 12 | .0109 | .10385 | .0112 | .10504 | .0115 | .10622 | .0119 | .10738 | .0122 | .10852 | .0125 | .10966 |
| 13 | .0128 | .11077 | .0131 | .11187 | .0135 | .11296 | .0138 | .11404 | .0142 | .11510 | .0145 | .11614 |
| 14 | .0149 | .11718 | .0152 | .11820 | .0156 | .11921 | .0159 | .12021 | .0163 | .12120 | .0167 | .12217 |
| 15 | .0170 | .12314 | .0174 | .12409 | .0178 | .12504 | .0182 | .12597 | .0186 | .12689 | .0190 | .12781 |
| 16 | .0194 | .12871 | .0198 | .12961 | .0202 | .13049 | .0206 | .13137 | .0210 | .13223 | .0214 | .13309 |
| 17 | .0218 | .13394 | .0223 | .13478 | .0227 | .13561 | .0231 | .13644 | .0236 | .13726 | .0240 | .13807 |
| 18 | .0245 | .13887 | .0249 | .13966 | .0254 | .14045 | .0258 | .14123 | .0263 | .14200 | .0268 | .14276 |
| 19 | .0272 | .14352 | .0277 | .14427 | .0282 | .14502 | .0287 | .14576 | .0292 | .14649 | .0297 | .14721 |
| 20 | .0302 | .14793 | .0307 | .14865 | .0312 | .14935 | .0317 | .15006 | .0322 | .15075 | .0327 | .15144 |
| 21 | .0332 | .15213 | .0337 | .15281 | .0343 | .15348 | .0348 | .15415 | .0353 | .15481 | .0359 | .15547 |
| 22 | .0364 | .15612 | .0370 | .15677 | .0375 | .15741 | .0381 | .15805 | .0386 | .15868 | .0392 | .15931 |
| 23 | .0397 | .15993 | .0403 | .16055 | .0409 | .16116 | .0415 | .16177 | .0421 | .16238 | .0426 | .16298 |
| 24 | .0432 | .16358 | .0438 | .16417 | .0444 | .16476 | .0450 | .16534 | .0456 | .16592 | .0462 | .16650 |
| 25 | .0468 | .16707 | .0475 | .16764 | .0481 | .16820 | .0487 | .16876 | .0493 | .16932 | .0500 | .16987 |
| 26 | .0506 | .17042 | .0512 | .17096 | .0519 | .17150 | .0525 | .17204 | .0532 | .17258 | .0538 | .17311 |
| 27 | .0545 | .17364 | .0552 | .17416 | .0558 | .17468 | .0565 | .17520 | .0572 | .17572 | .0578 | .17623 |
| 28 | .0585 | .17674 | .0592 | .17724 | .0599 | .17774 | .0606 | .17824 | .0613 | .17874 | .0620 | .17923 |
| 29 | .0627 | .17972 | .0634 | .18021 | .0641 | .18069 | .0648 | .18117 | .0655 | .18165 | .0663 | .18213 |
| 30 | .0670 | .18260 | .0677 | .18307 | .0684 | .18354 | .0692 | .18400 | .0699 | .18446 | .0707 | .18492 |
| 31 | .0714 | .18538 | .0722 | .18583 | .0729 | .18629 | .0737 | .18673 | .0744 | .18718 | .0752 | .18763 |
| 32 | .0760 | .18807 | .0767 | .18851 | .0775 | .18894 | .0783 | .18938 | .0791 | .18981 | .0799 | .19024 |
| 33 | .0807 | .19067 | .0815 | .19109 | .0823 | .19152 | .0831 | .19194 | .0839 | .19236 | .0847 | .19277 |
| 34 | .0855 | .19319 | .0863 | .19360 | .0871 | .19401 | .0879 | .19442 | .0888 | .19482 | .0896 | .19523 |
| 35 | .0904 | .19563 | .0913 | .19603 | .0921 | .19643 | .0929 | .19682 | .0938 | .19721 | .0946 | .19761 |
| 36 | .0955 | .19800 | .0963 | .19838 | .0972 | .19877 | .0981 | .19915 | .0989 | .19954 | .0998 | .19992 |
| 37 | .1007 | .20030 | .1016 | .20067 | .1024 | .20105 | .1033 | .20142 | .1042 | .20179 | .1051 | .20216 |
| 38 | .1060 | .20253 | .1069 | .20289 | .1078 | .20326 | .1087 | .20362 | .1096 | .20398 | .1105 | .20434 |
| 39 | .1114 | .20470 | .1123 | .20505 | .1133 | .20541 | .1142 | .20576 | .1151 | .20611 | .1160 | .20646 |
| 40 | .1170 | .20681 | .1179 | .20716 | .1189 | .20750 | .1198 | .20784 | .1207 | .20819 | .1217 | .20853 |
| 41 | .1226 | .20887 | .1236 | .20920 | .1246 | .20954 | .1255 | .20987 | .1265 | .21020 | .1275 | .21054 |
| 42 | .1284 | .21087 | .1294 | .21119 | .1304 | .21152 | .1314 | .21185 | .1323 | .21217 | .1333 | .21249 |
| 43 | .1343 | .21282 | .1353 | .21314 | .1363 | .21345 | .1373 | .21377 | .1383 | .21409 | .1393 | .21440 |
| 44 | .1403 | .21472 | .1413 | .21503 | .1424 | .21534 | .1434 | .21565 | .1444 | .21596 | .1454 | .21626 |
| 45 | .1464 | .21657 | .1475 | .21687 | .1485 | .21718 | .1495 | .21748 | .1506 | .21778 | .1516 | .21808 |
| 46 | .1527 | .21838 | .1537 | .21867 | .1548 | .21897 | .1558 | .21926 | .1569 | .21956 | .1579 | .21985 |
| 47 | .1590 | .22014 | .1601 | .22043 | .1611 | .22072 | .1622 | .22101 | .1633 | .22129 | .1644 | .22158 |
| 48 | .1654 | .22186 | .1665 | .22215 | .1676 | .22243 | .1687 | .22271 | .1698 | .22299 | .1709 | .22327 |
| 49 | .1720 | .22355 | .1731 | .22382 | .1742 | .22410 | .1753 | .22437 | .1764 | .22465 | .1775 | .22492 |
| 50 | .1786 | .22519 | .1797 | .22546 | .1808 | .22573 | .1820 | .22600 | .1831 | .22627 | .1842 | .22653 |
| 51 | .1853 | .22680 | .1865 | .22706 | .1876 | .22732 | .1887 | .22759 | .1899 | .22785 | .1910 | .22811 |
| 52 | .1922 | .22837 | .1933 | .22863 | .1945 | .22888 | .1956 | .22914 | .1968 | .22940 | .1979 | .22965 |
| 53 | .1991 | .22991 | .2003 | .23016 | .2014 | .23041 | .2026 | .23066 | .2038 | .23091 | .2049 | .23116 |
| 54 | .2061 | .23141 | .2073 | .23166 | .2085 | .23190 | .2096 | .23215 | .2108 | .23239 | .2120 | .23264 |
| 55 | .2132 | .23288 | .2144 | .23312 | .2156 | .23336 | .2168 | .23361 | .2180 | .23384 | .2192 | .23408 |
| 56 | .2204 | .23432 | .2216 | .23456 | .2228 | .23480 | .2240 | .23503 | .2252 | .23527 | .2265 | .23550 |
| 57 | .2277 | .23573 | .2289 | .23596 | .2301 | .23620 | .2314 | .23643 | .2326 | .23666 | .2338 | .23689 |
| 58 | .2350 | .23711 | .2363 | .23734 | .2375 | .23757 | .2388 | .23779 | .2400 | .23802 | .2412 | .23824 |
| 59 | .2425 | .23847 | .2437 | .23869 | .2450 | .23891 | .2462 | .23913 | .2475 | .23935 | .2487 | .23957 |

HAVERSINES (Continued)

Characteristics of the logarithms are omitted.

| ° | 0' | | 10' | | 20' | | 30' | | 40' | | 50' | |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | Value | Log | Value | Log | Value | Log | Value | Log | Value | Log | Value | Log |
| 60 | .2500 | .3979 | .2513 | .4001 | .2525 | .4023 | .2538 | .4045 | .2551 | .4066 | .2563 | .4088 |
| 61 | .2576 | .4109 | .2589 | .4131 | .2601 | .4152 | .2614 | .4173 | .2627 | .4195 | .2640 | .4216 |
| 62 | .2653 | .4237 | .2665 | .4258 | .2678 | .4279 | .2691 | .4300 | .2704 | .4320 | .2717 | .4341 |
| 63 | .2730 | .4362 | .2743 | .4382 | .2756 | .4403 | .2769 | .4423 | .2782 | .4444 | .2795 | .4464 |
| 64 | .2808 | .4484 | .2821 | .4504 | .2834 | .4524 | .2847 | .4545 | .2861 | .4565 | .2874 | .4584 |
| 65 | .2887 | .4604 | .2900 | .4624 | .2913 | .4644 | .2927 | .4664 | .2940 | .4683 | .2953 | .4703 |
| 66 | .2966 | .4722 | .2980 | .4742 | .2993 | .4761 | .3006 | .4780 | .3020 | .4799 | .3033 | .4819 |
| 67 | .3046 | .4838 | .3060 | .4857 | .3073 | .4876 | .3087 | .4895 | .3100 | .4914 | .3113 | .4932 |
| 68 | .3127 | .4951 | .3140 | .4970 | .3154 | .4989 | .3167 | .5007 | .3181 | .5026 | .3195 | .5044 |
| 69 | .3208 | .5063 | .3222 | .5081 | .3235 | .5099 | .3249 | .5117 | .3263 | .5136 | .3276 | .5154 |
| 70 | .3290 | .5172 | .3304 | .5190 | .3317 | .5208 | .3331 | .5226 | .3345 | .5244 | .3358 | .5261 |
| 71 | .3372 | .5279 | .3386 | .5297 | .3400 | .5314 | .3413 | .5332 | .3427 | .5349 | .3441 | .5367 |
| 72 | .3455 | .5384 | .3469 | .5402 | .3483 | .5419 | .3496 | .5436 | .3510 | .5454 | .3524 | .5471 |
| 73 | .3538 | .5488 | .3552 | .5505 | .3566 | .5522 | .3580 | .5539 | .3594 | .5556 | .3608 | .5572 |
| 74 | .3622 | .5589 | .3636 | .5606 | .3650 | .5623 | .3664 | .5639 | .3678 | .5656 | .3692 | .5672 |
| 75 | .3706 | .5689 | .3720 | .5705 | .3734 | .5722 | .3748 | .5738 | .3762 | .5754 | .3776 | .5771 |
| 76 | .3790 | .5787 | .3805 | .5803 | .3819 | .5819 | .3833 | .5835 | .3847 | .5851 | .3861 | .5867 |
| 77 | .3875 | .5883 | .3889 | .5899 | .3904 | .5915 | .3918 | .5930 | .3932 | .5946 | .3946 | .5962 |
| 78 | .3960 | .5977 | .3975 | .5993 | .3989 | .6009 | .4003 | .6024 | .4017 | .6039 | .4032 | .6055 |
| 79 | .4046 | .6070 | .4060 | .6086 | .4075 | .6101 | .4089 | .6116 | .4103 | .6131 | .4117 | .6146 |
| 80 | .4132 | .6161 | .4146 | .6176 | .4160 | .6191 | .4175 | .6206 | .4189 | .6221 | .4203 | .6236 |
| 81 | .4218 | .6251 | .4232 | .6266 | .4247 | .6280 | .4261 | .6295 | .4275 | .6310 | .4290 | .6324 |
| 82 | .4304 | .6339 | .4319 | .6353 | .4333 | .6368 | .4347 | .6382 | .4362 | .6397 | .4376 | .6411 |
| 83 | .4391 | .6425 | .4405 | .6440 | .4420 | .6454 | .4434 | .6468 | .4448 | .6482 | .4463 | .6496 |
| 84 | .4477 | .6510 | .4492 | .6524 | .4506 | .6538 | .4521 | .6552 | .4535 | .6566 | .4550 | .6580 |
| 85 | .4564 | .6594 | .4579 | .6607 | .4593 | .6621 | .4608 | .6635 | .4622 | .6648 | .4637 | .6662 |
| 86 | .4651 | .6676 | .4666 | .6689 | .4680 | .6703 | .4695 | .6716 | .4709 | .6730 | .4724 | .6743 |
| 87 | .4738 | .6756 | .4753 | .6770 | .4767 | .6783 | .4782 | .6796 | .4796 | .6809 | .4811 | .6822 |
| 88 | .4826 | .6835 | .4840 | .6848 | .4855 | .6862 | .4869 | .6875 | .4884 | .6887 | .4898 | .6900 |
| 89 | .4913 | .6913 | .4927 | .6926 | .4942 | .6939 | .4956 | .6952 | .4971 | .6964 | .4985 | .6977 |
| 90 | .5000 | .6990 | .5015 | .7002 | .5029 | .7015 | .5044 | .7027 | .5058 | .7040 | .5073 | .7052 |
| 91 | .5087 | .7065 | .5102 | .7077 | .5116 | .7090 | .5131 | .7102 | .5145 | .7114 | .5160 | .7126 |
| 92 | .5174 | .7139 | .5189 | .7151 | .5204 | .7163 | .5218 | .7175 | .5233 | .7187 | .5247 | .7199 |
| 93 | .5232 | .7211 | .5276 | .7223 | .5291 | .7235 | .5305 | .7247 | .5320 | .7259 | .5334 | .7271 |
| 94 | .5349 | .7283 | .5363 | .7294 | .5378 | .7306 | .5392 | .7318 | .5407 | .7329 | .5421 | .7341 |
| 95 | .5436 | .7353 | .5450 | .7364 | .5465 | .7376 | .5479 | .7387 | .5494 | .7399 | .5508 | .7410 |
| 96 | .5523 | .7421 | .5537 | .7433 | .5552 | .7444 | .5566 | .7455 | .5580 | .7467 | .5595 | .7478 |
| 97 | .5609 | .7489 | .5624 | .7500 | .5638 | .7511 | .5653 | .7523 | .5667 | .7534 | .5681 | .7545 |
| 98 | .5696 | .7556 | .5710 | .7567 | .5725 | .7577 | .5739 | .7588 | .5753 | .7599 | .5768 | .7610 |
| 99 | .5782 | .7621 | .5797 | .7632 | .5811 | .7642 | .5825 | .7653 | .5840 | .7664 | .5854 | .7674 |
| 100 | .5868 | .7685 | .5883 | .7696 | .5897 | .7706 | .5911 | .7717 | .5925 | .7727 | .5940 | .7738 |
| 101 | .5954 | .7748 | .5968 | .7759 | .5983 | .7769 | .5997 | .7779 | .6011 | .7790 | .6025 | .7800 |
| 102 | .6040 | .7810 | .6054 | .7820 | .6068 | .7830 | .6082 | .7841 | .6096 | .7851 | .6111 | .7861 |
| 103 | .6125 | .7871 | .6139 | .7881 | .6153 | .7891 | .6167 | .7901 | .6181 | .7911 | .6195 | .7921 |
| 104 | .6210 | .7931 | .6224 | .7940 | .6238 | .7950 | .6252 | .7960 | .6266 | .7970 | .6280 | .7980 |
| 105 | .6294 | .7989 | .6308 | .7999 | .6322 | .8009 | .6336 | .8018 | .6350 | .8028 | .6364 | .8037 |
| 106 | .6378 | .8047 | .6392 | .8056 | .6406 | .8066 | .6420 | .8075 | .6434 | .8085 | .6448 | .8094 |
| 107 | .6462 | .8104 | .6476 | .8113 | .6490 | .8122 | .6504 | .8131 | .6517 | .8141 | .6531 | .8150 |
| 108 | .6545 | .8159 | .6559 | .8168 | .6573 | .8177 | .6587 | .8187 | .6600 | .8196 | .6614 | .8205 |
| 109 | .6628 | .8214 | .6642 | .8223 | .6655 | .8232 | .6669 | .8241 | .6683 | .8250 | .6696 | .8258 |
| 110 | .6710 | .8267 | .6724 | .8276 | .6737 | .8285 | .6751 | .8294 | .6765 | .8302 | .6778 | .8311 |
| 111 | .6792 | .8320 | .6805 | .8329 | .6819 | .8337 | .6833 | .8346 | .6846 | .8354 | .6860 | .8363 |
| 112 | .6873 | .8371 | .6887 | .8380 | .6900 | .8388 | .6913 | .8397 | .6927 | .8405 | .6940 | .8414 |
| 113 | .6954 | .8422 | .6967 | .8430 | .6980 | .8439 | .6994 | .8447 | .7007 | .8455 | .7020 | .8464 |
| 114 | .7034 | .8472 | .7047 | .8480 | .7060 | .8488 | .7073 | .8496 | .7087 | .8504 | .7100 | .8513 |
| 115 | .7113 | .8521 | .7126 | .8529 | .7139 | .8537 | .7153 | .8545 | .7166 | .8553 | .7179 | .8561 |
| 116 | .7192 | .8568 | .7205 | .8576 | .7218 | .8584 | .7231 | .8592 | .7244 | .8600 | .7257 | .8608 |
| 117 | .7270 | .8615 | .7283 | .8623 | .7296 | .8631 | .7309 | .8638 | .7322 | .8646 | .7335 | .8654 |
| 118 | .7347 | .8661 | .7360 | .8669 | .7373 | .8676 | .7386 | .8684 | .7399 | .8691 | .7411 | .8699 |
| 119 | .7424 | .8706 | .7437 | .8714 | .7449 | .8721 | .7462 | .8729 | .7475 | .8736 | .7487 | .8743 |

HAVERSINES (Continued)

Characteristics of the logarithms are omitted.

| ° | 0' | | 10' | | 20' | | 30' | | 40' | | 50' | |
|-----|--------|-------|-------|-------|--------|-------|--------|-------|--------|-------|--------|-------|
| | Value | Log | Value | Log | Value | Log | Value | Log | Value | Log | Value | Log |
| 120 | .7500 | .8751 | .7513 | .8758 | .7525 | .8765 | .7538 | .8772 | .7550 | .8780 | .7563 | .8787 |
| 121 | .7575 | .8794 | .7588 | .8801 | .7600 | .8808 | .7612 | .8815 | .7625 | .8822 | .7637 | .8829 |
| 122 | .7650 | .8836 | .7662 | .8843 | .7674 | .8850 | .7686 | .8857 | .7699 | .8864 | .7711 | .8871 |
| 123 | .7723 | .8878 | .7735 | .8885 | .7748 | .8892 | .7760 | .8898 | .7772 | .8905 | .7784 | .8912 |
| 124 | .7796 | .8919 | .7808 | .8925 | .7820 | .8932 | .7832 | .8939 | .7844 | .8945 | .7856 | .8952 |
| 125 | .7868 | .8959 | .7880 | .8965 | .7892 | .8972 | .7904 | .8978 | .7915 | .8985 | .7927 | .8991 |
| 126 | .7939 | .8998 | .7951 | .9004 | .7962 | .9010 | .7974 | .9017 | .7986 | .9023 | .7997 | .9030 |
| 127 | .8009 | .9036 | .8021 | .9042 | .8032 | .9048 | .8044 | .9055 | .8055 | .9061 | .8067 | .9067 |
| 128 | .8078 | .9073 | .8090 | .9079 | .8101 | .9085 | .8113 | .9092 | .8124 | .9098 | .8135 | .9104 |
| 129 | .8147 | .9110 | .8158 | .9116 | .8169 | .9122 | .8180 | .9128 | .8192 | .9134 | .8203 | .9140 |
| 130 | .8214 | .9146 | .8225 | .9151 | .8236 | .9157 | .8247 | .9163 | .8258 | .9169 | .8269 | .9175 |
| 131 | .8280 | .9180 | .8291 | .9186 | .8302 | .9192 | .8313 | .9198 | .8324 | .9203 | .8335 | .9209 |
| 132 | .8346 | .9215 | .8356 | .9220 | .8367 | .9226 | .8378 | .9231 | .8389 | .9237 | .8399 | .9242 |
| 133 | .8410 | .9248 | .8421 | .9253 | .8431 | .9259 | .8442 | .9264 | .8452 | .9270 | .8463 | .9275 |
| 134 | .8473 | .9281 | .8484 | .9286 | .8494 | .9291 | .8505 | .9297 | .8515 | .9302 | .8525 | .9307 |
| 135 | .8536 | .9312 | .8546 | .9318 | .8556 | .9323 | .8566 | .9328 | .8576 | .9333 | .8587 | .9338 |
| 136 | .8597 | .9343 | .8607 | .9348 | .8617 | .9353 | .8627 | .9359 | .8637 | .9364 | .8647 | .9369 |
| 137 | .8657 | .9374 | .8667 | .9379 | .8677 | .9383 | .8686 | .9388 | .8696 | .9393 | .8706 | .9398 |
| 138 | .8716 | .9403 | .8725 | .9408 | .8735 | .9413 | .8745 | .9417 | .8754 | .9422 | .8764 | .9427 |
| 139 | .8774 | .9432 | .8783 | .9436 | .8793 | .9441 | .8802 | .9446 | .8811 | .9450 | .8821 | .9455 |
| 140 | .8830 | .9460 | .8840 | .9464 | .8849 | .9469 | .8858 | .9473 | .8867 | .9478 | .8877 | .9482 |
| 141 | .8886 | .9487 | .8895 | .9491 | .8904 | .9496 | .8913 | .9500 | .8922 | .9505 | .8931 | .9509 |
| 142 | .8940 | .9513 | .8949 | .9518 | .8958 | .9522 | .8967 | .9526 | .8976 | .9531 | .8984 | .9535 |
| 143 | .8993 | .9539 | .9002 | .9543 | .9011 | .9548 | .9019 | .9552 | .9028 | .9556 | .9037 | .9560 |
| 144 | .9045 | .9564 | .9054 | .9568 | .9062 | .9572 | .9071 | .9576 | .9079 | .9580 | .9087 | .9584 |
| 145 | .9096 | .9588 | .9104 | .9592 | .9112 | .9596 | .9121 | .9600 | .9129 | .9604 | .9137 | .9608 |
| 146 | .9145 | .9612 | .9153 | .9616 | .9161 | .9620 | .9169 | .9623 | .9177 | .9627 | .9185 | .9631 |
| 147 | .9193 | .9635 | .9201 | .9638 | .9209 | .9642 | .9217 | .9646 | .9225 | .9650 | .9233 | .9653 |
| 148 | .9240 | .9657 | .9248 | .9660 | .9256 | .9664 | .9263 | .9668 | .9271 | .9671 | .9278 | .9675 |
| 149 | .9286 | .9678 | .9293 | .9682 | .9301 | .9685 | .9308 | .9689 | .9316 | .9692 | .9323 | .9695 |
| 150 | .9330 | .9699 | .9337 | .9702 | .9345 | .9706 | .9352 | .9709 | .9359 | .9712 | .9366 | .9716 |
| 151 | .9373 | .9719 | .9380 | .9722 | .9387 | .9725 | .9394 | .9729 | .9401 | .9732 | .9408 | .9735 |
| 152 | .9415 | .9738 | .9422 | .9741 | .9428 | .9744 | .9435 | .9747 | .9442 | .9751 | .9448 | .9754 |
| 153 | .9455 | .9757 | .9462 | .9760 | .9468 | .9763 | .9475 | .9766 | .9481 | .9769 | .9488 | .9772 |
| 154 | .9494 | .9774 | .9500 | .9777 | .9507 | .9780 | .9513 | .9783 | .9519 | .9786 | .9525 | .9789 |
| 155 | .9532 | .9792 | .9538 | .9794 | .9544 | .9797 | .9550 | .9800 | .9556 | .9803 | .9562 | .9805 |
| 156 | .9568 | .9808 | .9574 | .9811 | .9579 | .9813 | .9585 | .9816 | .9591 | .9819 | .9597 | .9821 |
| 157 | .9603 | .9824 | .9608 | .9826 | .9614 | .9829 | .9619 | .9831 | .9625 | .9834 | .9630 | .9836 |
| 158 | .9636 | .9839 | .9641 | .9841 | .9647 | .9844 | .9652 | .9846 | .9657 | .9849 | .9663 | .9851 |
| 159 | .9668 | .9853 | .9673 | .9856 | .9678 | .9858 | .9683 | .9860 | .9688 | .9863 | .9693 | .9865 |
| 160 | .9698 | .9867 | .9703 | .9869 | .9708 | .9871 | .9713 | .9874 | .9718 | .9876 | .9723 | .9878 |
| 161 | .9728 | .9880 | .9732 | .9882 | .9737 | .9884 | .9742 | .9886 | .9746 | .9888 | .9751 | .9890 |
| 162 | .9755 | .9892 | .9760 | .9894 | .9764 | .9896 | .9769 | .9898 | .9773 | .9900 | .9777 | .9902 |
| 163 | .9782 | .9904 | .9786 | .9906 | .9790 | .9908 | .9794 | .9910 | .9798 | .9911 | .9802 | .9913 |
| 164 | .9806 | .9915 | .9810 | .9917 | .9814 | .9919 | .9818 | .9920 | .9822 | .9922 | .9826 | .9924 |
| 165 | .9830 | .9925 | .9833 | .9927 | .9837 | .9929 | .9841 | .9930 | .9844 | .9932 | .9848 | .9933 |
| 166 | .9851 | .9935 | .9855 | .9937 | .9858 | .9938 | .9862 | .9940 | .9865 | .9941 | .9869 | .9943 |
| 167 | .9872 | .9944 | .9875 | .9945 | .9878 | .9947 | .9881 | .9948 | .9885 | .9950 | .9888 | .9951 |
| 168 | .9891 | .9952 | .9894 | .9954 | .9897 | .9955 | .9900 | .9956 | .9903 | .9957 | .9905 | .9959 |
| 169 | .9908 | .9960 | .9911 | .9961 | .9914 | .9962 | .9916 | .9963 | .9919 | .9965 | .9921 | .9966 |
| 170 | .9924 | .9967 | .9927 | .9968 | .9929 | .9969 | .9931 | .9970 | .9934 | .9971 | .9936 | .9972 |
| 171 | .9938 | .9973 | .9941 | .9974 | .9943 | .9975 | .9945 | .9976 | .9947 | .9977 | .9949 | .9978 |
| 172 | .9951 | .9979 | .9953 | .9980 | .9955 | .9981 | .9957 | .9981 | .9959 | .9982 | .9961 | .9983 |
| 173 | .9963 | .9984 | .9964 | .9985 | .9966 | .9985 | .9968 | .9986 | .9969 | .9987 | .9971 | .9987 |
| 174 | .9973 | .9988 | .9974 | .9989 | .9976 | .9989 | .9977 | .9990 | .9978 | .9991 | .9980 | .9991 |
| 175 | .9981 | .9992 | .9982 | .9992 | .9983 | .9993 | .9985 | .9993 | .9986 | .9994 | .9987 | .9994 |
| 176 | .9988 | .9995 | .9989 | .9995 | .9990 | .9996 | .9991 | .9996 | .9992 | .9996 | .9992 | .9997 |
| 177 | .9993 | .9997 | .9994 | .9997 | .9995 | .9998 | .9995 | .9998 | .9996 | .9998 | .9996 | .9998 |
| 178 | .9997 | .9999 | .9997 | .9999 | .9998 | .9999 | .9998 | .9999 | .9999 | .9999 | .9999 | .9999 |
| 179 | .9999 | .9999 | .9999 | .9999 | 1.0000 | .0000 | 1.0000 | .0000 | 1.0000 | .0000 | 1.0000 | .0000 |
| 180 | 1.0000 | .0000 | | | | | | | | | | |

NATURAL OR NAPERIAN LOGARITHMS

To find the natural logarithm of a number which is 1/10 or 10 times a number whose logarithm is given, subtract from or add to the given logarithm the logarithm of 10.

A 0.00-0.99

-10 should be appended to each logarithm

| N | .00 | .01 | .02 | .03 | .04 | .05 | .06 | .07 | .08 | .09 |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.0 | | 5.395 | 6.088 | 6.493 | 6.781 | 7.004 | 7.187 | 7.341 | 7.474 | 7.592 |
| 0.1 | 7.697 | 7.793 | 7.880 | 7.960 | 8.034 | 8.103 | 8.167 | 8.228 | 8.285 | 8.339 |
| 0.2 | 8.391 | 8.439 | 8.486 | 8.530 | 8.573 | 8.614 | 8.653 | 8.691 | 8.727 | 8.762 |
| 0.3 | 8.796 | 8.829 | 8.861 | 8.891 | 8.921 | 8.950 | 8.978 | 9.006 | 9.032 | 9.058 |
| 0.4 | 9.084 | 9.108 | 9.132 | 9.156 | 9.179 | 9.201 | 9.223 | 9.245 | 9.266 | 9.287 |
| 0.5 | 9.307 | 9.327 | 9.346 | 9.365 | 9.384 | 9.402 | 9.420 | 9.438 | 9.455 | 9.472 |
| 0.6 | 9.489 | 9.506 | 9.522 | 9.538 | 9.554 | 9.569 | 9.584 | 9.600 | 9.614 | 9.629 |
| 0.7 | 9.643 | 9.658 | 9.671 | 9.685 | 9.699 | 9.712 | 9.726 | 9.739 | 9.752 | 9.764 |
| 0.8 | 9.777 | 9.789 | 9.802 | 9.814 | 9.826 | 9.837 | 9.849 | 9.861 | 9.872 | 9.883 |
| 0.9 | 9.895 | 9.906 | 9.917 | 9.927 | 9.938 | 9.949 | 9.959 | 9.970 | 9.980 | 9.990 |

B 1.00-10.09

| N | .00 | .01 | .02 | .03 | .04 | .05 | .06 | .07 | .08 | .09 |
|-----|-----|------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1.0 | 0.0 | 0000 | 0995 | 1980 | 2956 | 3922 | 4879 | 5827 | 6766 | 7696 |
| 1.1 | | 9531 | *0436 | *1333 | *2222 | *3103 | *3976 | *4842 | *5700 | *6551 |
| 1.2 | 0.1 | 8232 | 9062 | 9885 | *0701 | *1511 | *2314 | *3111 | *3902 | *4686 |
| 1.3 | 0.2 | 6236 | 7003 | 7763 | 8518 | 9267 | *0010 | *0748 | *1481 | *2208 |
| 1.4 | 0.3 | 3647 | 4359 | 5066 | 5767 | 6464 | 7156 | 7844 | 8526 | 9204 |
| 1.5 | 0.4 | 0547 | 1211 | 1871 | 2527 | 3178 | 3825 | 4469 | 5108 | 5742 |
| 1.6 | | 7000 | 7623 | 8243 | 8858 | 9470 | *0078 | *0682 | *1282 | *1879 |
| 1.7 | 0.5 | 3063 | 3649 | 4232 | 4812 | 5389 | 5962 | 6531 | 7098 | 7661 |
| 1.8 | | 8779 | 9333 | 9884 | *0432 | *0977 | *1519 | *2058 | *2594 | *3127 |
| 1.9 | 0.6 | 4185 | 4710 | 5233 | 5752 | 6269 | 6783 | 7294 | 7803 | 8310 |
| 2.0 | | 9315 | 9813 | *0310 | *0804 | *1295 | *1784 | *2271 | *2755 | *3237 |
| 2.1 | 0.7 | 4194 | 4669 | 5142 | 5612 | 6081 | 6547 | 7011 | 7473 | 7932 |
| 2.2 | | 8846 | 9299 | 9751 | *0200 | *0648 | *1093 | *1536 | *1978 | *2418 |
| 2.3 | 0.8 | 3291 | 3725 | 4157 | 4587 | 5015 | 5442 | 5866 | 6289 | 6710 |
| 2.4 | | 7547 | 7963 | 8377 | 8789 | 9200 | 9609 | *0016 | *0422 | *0826 |
| 2.5 | 0.9 | 1629 | 2028 | 2426 | 2822 | 3216 | 3609 | 4001 | 4391 | 4779 |
| 2.6 | | 5551 | 5935 | 6317 | 6698 | 7078 | 7456 | 7833 | 8208 | 8582 |
| 2.7 | | 9325 | 9695 | *0063 | *0430 | *0796 | *1160 | *1523 | *1885 | *2245 |
| 2.8 | 1.0 | 2962 | 3318 | 3674 | 4028 | 4380 | 4732 | 5082 | 5431 | 5779 |
| 2.9 | | 6471 | 6815 | 7158 | 7500 | 7841 | 8181 | 8519 | 8856 | 9192 |
| 3.0 | | 9861 | *0194 | *0526 | *0856 | *1186 | *1514 | *1841 | *2168 | *2493 |
| 3.1 | 1.1 | 3140 | 3462 | 3783 | 4103 | 4422 | 4740 | 5057 | 5373 | 5688 |
| 3.2 | | 6315 | 6627 | 6938 | 7248 | 7557 | 7865 | 8173 | 8479 | 8784 |
| 3.3 | | 9392 | 9695 | 9996 | *0297 | *0597 | *0896 | *1194 | *1491 | *1788 |
| 3.4 | 1.2 | 2378 | 2671 | 2964 | 3256 | 3547 | 3837 | 4127 | 4415 | 4703 |
| 3.5 | | 5276 | 5562 | 5846 | 6130 | 6413 | 6695 | 6976 | 7257 | 7536 |
| 3.6 | | 8093 | 8371 | 8647 | 8923 | 9198 | 9473 | 9746 | *0019 | *0291 |
| 3.7 | 1.3 | 0833 | 1103 | 1372 | 1641 | 1909 | 2176 | 2442 | 2708 | 2972 |
| 3.8 | | 3500 | 3763 | 4025 | 4286 | 4547 | 4807 | 5067 | 5325 | 5584 |
| 3.9 | | 6098 | 6354 | 6609 | 6864 | 7118 | 7372 | 7624 | 7877 | 8128 |
| 4.0 | | 8629 | 8879 | 9128 | 9377 | 9624 | 9872 | *0118 | *0364 | *0610 |
| 4.1 | 1.4 | 1099 | 1342 | 1585 | 1828 | 2070 | 2311 | 2552 | 2792 | 3031 |
| 4.2 | | 3508 | 3746 | 3984 | 4220 | 4456 | 4692 | 4927 | 5161 | 5395 |
| 4.3 | | 5862 | 6094 | 6326 | 6557 | 6787 | 7018 | 7247 | 7476 | 7705 |
| 4.4 | | 8160 | 8387 | 8614 | 8840 | 9065 | 9290 | 9515 | 9739 | 9962 |
| 4.5 | 1.5 | 0408 | 0630 | 0851 | 1072 | 1293 | 1513 | 1732 | 1951 | 2170 |
| 4.6 | | 2606 | 2823 | 3039 | 3256 | 3471 | 3687 | 3902 | 4116 | 4330 |
| 4.7 | | 4756 | 4969 | 5181 | 5393 | 5604 | 5814 | 6025 | 6235 | 6444 |
| 4.8 | | 6862 | 7070 | 7277 | 7485 | 7691 | 7898 | 8104 | 8309 | 8515 |
| 4.9 | | 8924 | 9127 | 9331 | 9534 | 9737 | 9939 | *0141 | *0342 | *0543 |
| 5.0 | 1.6 | 0944 | 1144 | 1343 | 1542 | 1741 | 1939 | 2137 | 2334 | 2531 |
| 5.1 | | 2924 | 3120 | 3315 | 3511 | 3705 | 3900 | 4094 | 4287 | 4481 |
| 5.2 | | 4866 | 5058 | 5250 | 5441 | 5632 | 5823 | 6013 | 6203 | 6393 |
| 5.3 | | 6771 | 6959 | 7147 | 7335 | 7523 | 7710 | 7896 | 8083 | 8269 |
| 5.4 | | 8640 | 8825 | 9010 | 9194 | 9378 | 9562 | 9745 | 9928 | *0111 |

NATURAL LOGARITHMS

II 1.00-10.09 (Concluded)

| N | | .00 | .01 | .02 | .03 | .04 | .05 | .06 | .07 | .08 | .09 |
|------|-----|------|------|------|-------|-------|-------|-------|-------|-------|-------|
| 5.5 | 1.7 | 0475 | 0656 | 0838 | 1019 | 1199 | 1380 | 1560 | 1740 | 1919 | 2098 |
| 5.6 | | 2277 | 2455 | 2633 | 2811 | 2988 | 3166 | 3342 | 3519 | 3695 | 3871 |
| 5.7 | | 4047 | 4222 | 4397 | 4572 | 4746 | 4920 | 5094 | 5267 | 5440 | 5613 |
| 5.8 | | 5786 | 5958 | 6130 | 6302 | 6473 | 6644 | 6815 | 6985 | 7156 | 7326 |
| 5.9 | | 7495 | 7665 | 7834 | 8002 | 8171 | 8339 | 8507 | 8675 | 8842 | 9009 |
| 6.0 | | 9176 | 9342 | 9509 | 9675 | 9840 | *0006 | *0171 | *0336 | *0500 | *0665 |
| 6.1 | 1.8 | 0829 | 0993 | 1156 | 1319 | 1482 | 1645 | 1808 | 1970 | 2132 | 2294 |
| 6.2 | | 2455 | 2616 | 2777 | 2938 | 3098 | 3258 | 3418 | 3578 | 3737 | 3896 |
| 6.3 | | 4055 | 4214 | 4372 | 4530 | 4688 | 4845 | 5003 | 5160 | 5317 | 5473 |
| 6.4 | | 5630 | 5786 | 5942 | 6097 | 6253 | 6408 | 6563 | 6718 | 6872 | 7026 |
| 6.5 | | 7180 | 7334 | 7487 | 7641 | 7794 | 7947 | 8099 | 8251 | 8403 | 8555 |
| 6.6 | | 8707 | 8858 | 9010 | 9160 | 9311 | 9462 | 9612 | 9762 | 9912 | *0061 |
| 6.7 | 1.9 | 0211 | 0360 | 0509 | 0658 | 0806 | 0954 | 1102 | 1250 | 1398 | 1545 |
| 6.8 | | 1692 | 1839 | 1986 | 2132 | 2279 | 2425 | 2571 | 2716 | 2862 | 3007 |
| 6.9 | | 3152 | 3297 | 3442 | 3586 | 3730 | 3874 | 4018 | 4162 | 4305 | 4448 |
| 7.0 | | 4591 | 4734 | 4876 | 5019 | 5161 | 5303 | 5445 | 5586 | 5727 | 5869 |
| 7.1 | | 6009 | 6150 | 6291 | 6431 | 6571 | 6711 | 6851 | 6991 | 7130 | 7269 |
| 7.2 | | 7408 | 7547 | 7685 | 7824 | 7962 | 8100 | 8238 | 8376 | 8513 | 8650 |
| 7.3 | | 8787 | 8924 | 9061 | 9198 | 9334 | 9470 | 9606 | 9742 | 9877 | *0013 |
| 7.4 | 2.0 | 0148 | 0283 | 0418 | 0553 | 0687 | 0821 | 0956 | 1089 | 1223 | 1357 |
| 7.5 | | 1490 | 1624 | 1757 | 1890 | 2022 | 2155 | 2287 | 2419 | 2551 | 2683 |
| 7.6 | | 2815 | 2946 | 3078 | 3209 | 3340 | 3471 | 3601 | 3732 | 3862 | 3992 |
| 7.7 | | 4122 | 4252 | 4381 | 4511 | 4640 | 4769 | 4898 | 5027 | 5156 | 5284 |
| 7.8 | | 5412 | 5540 | 5668 | 5796 | 5924 | 6051 | 6179 | 6306 | 6433 | 6560 |
| 7.9 | | 6686 | 6813 | 6939 | 7065 | 7191 | 7317 | 7443 | 7568 | 7694 | 7819 |
| 8.0 | | 7944 | 8069 | 8194 | 8318 | 8443 | 8567 | 8691 | 8815 | 8939 | 9063 |
| 8.1 | | 9186 | 9310 | 9433 | 9556 | 9679 | 9802 | 9924 | *0047 | *0169 | *0291 |
| 8.2 | 2.1 | 0413 | 0535 | 0657 | 0779 | 0900 | 1021 | 1142 | 1263 | 1384 | 1505 |
| 8.3 | | 1626 | 1746 | 1866 | 1986 | 2106 | 2226 | 2346 | 2465 | 2585 | 2704 |
| 8.4 | | 2823 | 2942 | 3061 | 3180 | 3298 | 3417 | 3535 | 3653 | 3771 | 3889 |
| 8.5 | | 4007 | 4124 | 4242 | 4359 | 4476 | 4593 | 4710 | 4827 | 4943 | 5060 |
| 8.6 | | 5176 | 5292 | 5409 | 5524 | 5640 | 5756 | 5871 | 5987 | 6102 | 6217 |
| 8.7 | | 6332 | 6447 | 6562 | 6677 | 6791 | 6905 | 7020 | 7134 | 7248 | 7361 |
| 8.8 | | 7475 | 7589 | 7702 | 7816 | 7929 | 8042 | 8155 | 8267 | 8380 | 8493 |
| 8.9 | | 8605 | 8717 | 8830 | 8942 | 9054 | 9165 | 9277 | 9389 | 9500 | 9611 |
| 9.0 | | 9722 | 9834 | 9944 | *0055 | *0166 | *0276 | *0387 | *0497 | *0607 | *0717 |
| 9.1 | 2.2 | 0827 | 0937 | 1047 | 1157 | 1266 | 1375 | 1485 | 1594 | 1703 | 1812 |
| 9.2 | | 1920 | 2029 | 2138 | 2246 | 2354 | 2462 | 2570 | 2678 | 2786 | 2894 |
| 9.3 | | 3001 | 3109 | 3216 | 3324 | 3431 | 3538 | 3645 | 3751 | 3858 | 3965 |
| 9.4 | | 4071 | 4177 | 4284 | 4390 | 4496 | 4601 | 4707 | 4813 | 4918 | 5024 |
| 9.5 | | 5129 | 5234 | 5339 | 5444 | 5549 | 5654 | 5759 | 5863 | 5968 | 6072 |
| 9.6 | | 6176 | 6280 | 6384 | 6488 | 6592 | 6696 | 6799 | 6903 | 7006 | 7109 |
| 9.7 | | 7213 | 7316 | 7419 | 7521 | 7624 | 7727 | 7829 | 7932 | 8034 | 8136 |
| 9.8 | | 8238 | 8340 | 8442 | 8544 | 8646 | 8747 | 8849 | 8950 | 9051 | 9152 |
| 9.9 | | 9253 | 9354 | 9455 | 9556 | 9657 | 9757 | 9858 | 9958 | *0058 | *0158 |
| 10.0 | 2.3 | 0259 | 0358 | 0458 | 0558 | 0658 | 0757 | 0857 | 0956 | 1055 | 1154 |

C 10-99

| N | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|----|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 | 2. | 30259 | 39790 | 48491 | 56495 | 63906 | 70805 | 77259 | 83321 | 89037 | 94444 |
| 2 | | 99573 | *04452 | *09104 | *13549 | *17805 | *21888 | *25810 | *29584 | *33220 | *36730 |
| 3 | 3. | 40120 | 43399 | 46574 | 49651 | 52636 | 55535 | 58352 | 61092 | 63759 | 66356 |
| 4 | | 68888 | 71357 | 73767 | 76120 | 78419 | 80666 | 82864 | 85015 | 87120 | 89182 |
| 5 | | 91202 | 93183 | 95124 | 97029 | 98898 | *00733 | *02535 | *04305 | *06044 | *07754 |
| 6 | 4. | 09434 | 11087 | 12713 | 14313 | 15888 | 17439 | 18965 | 20469 | 21951 | 23411 |
| 7 | | 24850 | 26268 | 27667 | 29046 | 30407 | 31749 | 33073 | 34381 | 35671 | 36945 |
| 8 | | 38203 | 39445 | 40672 | 41884 | 43082 | 44265 | 45435 | 46591 | 47734 | 48864 |
| 9 | | 49981 | 51086 | 52179 | 53260 | 54329 | 55388 | 56435 | 57471 | 58497 | 59512 |

NATURAL LOGARITHMS

D 100-1109

| N | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
|----|-----|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 10 | 4.6 | 0517 | 1512 | 2497 | 3473 | 4439 | 5396 | 6344 | 7283 | 8213 | 9135 |
| 11 | 4.7 | 0048 | 0953 | 1850 | 2739 | 3620 | 4493 | 5359 | 6217 | 7068 | 7912 |
| 12 | | 8749 | 9579 | *0402 | *1218 | *2028 | *2831 | *3628 | *4419 | *5203 | *5981 |
| 13 | 4.8 | 6753 | 7520 | 8280 | 9035 | 9784 | *0527 | *1265 | *1998 | *2725 | *3447 |
| 14 | 4.9 | 4164 | 4876 | 5583 | 6284 | 6981 | 7673 | 8361 | 9043 | 9721 | *0395 |
| 15 | 5.0 | 1064 | 1728 | 2388 | 3044 | 3695 | 4343 | 4986 | 5625 | 6260 | 6890 |
| 16 | | 7517 | 8140 | 8760 | 9375 | 9987 | *0595 | *1199 | *1799 | *2396 | *2990 |
| 17 | 5.1 | 3580 | 4166 | 4749 | 5329 | 5906 | 6479 | 7048 | 7615 | 8178 | 8739 |
| 18 | | 9296 | 9850 | *0401 | *0949 | *1494 | *2036 | *2575 | *3111 | *3644 | *4175 |
| 19 | 5.2 | 4702 | 5227 | 5750 | 6269 | 6786 | 7300 | 7811 | 8320 | 8827 | 9330 |
| 20 | | 9832 | *0330 | *0827 | *1321 | *1812 | *2301 | *2788 | *3272 | *3754 | *4233 |
| 21 | 5.3 | 4711 | 5186 | 5659 | 6129 | 6598 | 7064 | 7528 | 7990 | 8450 | 8907 |
| 22 | | 9363 | 9816 | *0268 | *0717 | *1165 | *1610 | *2053 | *2495 | *2935 | *3372 |
| 23 | 5.4 | 3808 | 4242 | 4674 | 5104 | 5532 | 5959 | 6383 | 6806 | 7227 | 7646 |
| 24 | | 8064 | 8480 | 8894 | 9306 | 9717 | *0126 | *0533 | *0939 | *1343 | *1745 |
| 25 | 5.5 | 2146 | 2545 | 2943 | 3339 | 3733 | 4126 | 4518 | 4908 | 5296 | 5683 |
| 26 | | 6068 | 6452 | 6834 | 7215 | 7595 | 7973 | 8350 | 8725 | 9099 | 9471 |
| 27 | | 9842 | *0212 | *0580 | *0947 | *1313 | *1677 | *2040 | *2402 | *2762 | *3121 |
| 28 | 5.6 | 3479 | 3835 | 4191 | 4545 | 4897 | 5249 | 5599 | 5948 | 6296 | 6643 |
| 29 | | 6988 | 7332 | 7675 | 8017 | 8358 | 8698 | 9036 | 9373 | 9709 | *0044 |
| 30 | 5.7 | 0378 | 0711 | 1043 | 1373 | 1703 | 2031 | 2359 | 2685 | 3010 | 3334 |
| 31 | | 3657 | 3979 | 4300 | 4620 | 4939 | 5257 | 5574 | 5890 | 6205 | 6519 |
| 32 | | 6832 | 7144 | 7455 | 7765 | 8074 | 8383 | 8690 | 8996 | 9301 | 9606 |
| 33 | | 9909 | *0212 | *0513 | *0814 | *1114 | *1413 | *1711 | *2008 | *2305 | *2600 |
| 34 | 5.8 | 2895 | 3188 | 3481 | 3773 | 4064 | 4354 | 4644 | 4932 | 5220 | 5507 |
| 35 | | 5793 | 6079 | 6363 | 6647 | 6930 | 7212 | 7493 | 7774 | 8053 | 8332 |
| 36 | | 8610 | 8888 | 9164 | 9440 | 9715 | 9990 | *0263 | *0536 | *0808 | *1080 |
| 37 | 5.9 | 1350 | 1620 | 1889 | 2158 | 2426 | 2693 | 2959 | 3225 | 3489 | 3754 |
| 38 | | 4017 | 4280 | 4542 | 4803 | 5064 | 5324 | 5584 | 5842 | 6101 | 6358 |
| 39 | | 6615 | 6871 | 7126 | 7381 | 7635 | 7889 | 8141 | 8394 | 8645 | 8896 |
| 40 | | 9146 | 9396 | 9645 | 9894 | *0141 | *0389 | *0635 | *0881 | *1127 | *1372 |
| 41 | 6.0 | 1616 | 1859 | 2102 | 2345 | 2587 | 2828 | 3069 | 3309 | 3548 | 3787 |
| 42 | | 4025 | 4263 | 4501 | 4737 | 4973 | 5209 | 5444 | 5678 | 5912 | 6146 |
| 43 | | 6379 | 6611 | 6843 | 7074 | 7304 | 7535 | 7764 | 7993 | 8222 | 8450 |
| 44 | | 8677 | 8904 | 9131 | 9357 | 9582 | 9807 | *0032 | *0256 | *0479 | *0702 |
| 45 | 6.1 | 0925 | 1147 | 1368 | 1589 | 1810 | 2030 | 2249 | 2468 | 2687 | 2905 |
| 46 | | 3123 | 3340 | 3556 | 3773 | 3988 | 4204 | 4419 | 4633 | 4847 | 5060 |
| 47 | | 5273 | 5486 | 5698 | 5910 | 6121 | 6331 | 6542 | 6752 | 6961 | 7170 |
| 48 | | 7379 | 7587 | 7794 | 8002 | 8208 | 8415 | 8621 | 8826 | 9032 | 9236 |
| 49 | | 9441 | 9644 | 9848 | *0051 | *0254 | *0456 | *0658 | *0859 | *1060 | *1261 |
| 50 | 6.2 | 1461 | 1661 | 1860 | 2059 | 2258 | 2456 | 2654 | 2851 | 3048 | 3245 |
| 51 | | 3441 | 3637 | 3832 | 4028 | 4222 | 4417 | 4611 | 4804 | 4998 | 5190 |
| 52 | | 5383 | 5575 | 5767 | 5958 | 6149 | 6340 | 6530 | 6720 | 6910 | 7099 |
| 53 | | 7288 | 7476 | 7664 | 7852 | 8040 | 8227 | 8413 | 8600 | 8786 | 8972 |
| 54 | | 9157 | 9342 | 9527 | 9711 | 9895 | *0079 | *0262 | *0445 | *0628 | *0810 |
| 55 | 6.3 | 0992 | 1173 | 1355 | 1536 | 1716 | 1897 | 2077 | 2257 | 2436 | 2615 |
| 56 | | 2794 | 2972 | 3150 | 3328 | 3505 | 3683 | 3859 | 4036 | 4212 | 4388 |
| 57 | | 4564 | 4739 | 4914 | 5089 | 5263 | 5437 | 5611 | 5784 | 5957 | 6130 |
| 58 | | 6303 | 6475 | 6647 | 6819 | 6990 | 7161 | 7332 | 7502 | 7673 | 7843 |
| 59 | | 8012 | 8182 | 8351 | 8519 | 8688 | 8856 | 9024 | 9192 | 9359 | 9526 |
| 60 | | 9693 | 9859 | *0026 | *0192 | *0357 | *0523 | *0688 | *0853 | *1017 | *1182 |
| N | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |

NATURAL LOGARITHMS

D 100-1109 (Concluded)

| N | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|-----|-----|------|------|-------|-------|-------|-------|-------|-------|-------|
| 60 | 6.3 | 9893 | 9859 | *0026 | *0192 | *0357 | *0523 | *0688 | *0853 | *1017 |
| 61 | 6.4 | 1346 | 1510 | 1673 | 1836 | 1999 | 2162 | 2325 | 2487 | 2649 |
| 62 | | 2972 | 3133 | 3294 | 3455 | 3615 | 3775 | 3935 | 4095 | 4254 |
| 63 | | 4572 | 4731 | 4889 | 5047 | 5205 | 5362 | 5520 | 5677 | 5834 |
| 64 | | 6147 | 6303 | 6459 | 6614 | 6770 | 6925 | 7080 | 7235 | 7389 |
| 65 | | 7697 | 7851 | 8004 | 8158 | 8311 | 8464 | 8616 | 8768 | 8920 |
| 66 | | 9224 | 9375 | 9527 | 9677 | 9828 | 9979 | *0129 | *0279 | *0429 |
| 67 | 6.5 | 0728 | 0877 | 1026 | 1175 | 1323 | 1471 | 1619 | 1767 | 1915 |
| 68 | | 2209 | 2356 | 2503 | 2649 | 2796 | 2942 | 3088 | 3233 | 3379 |
| 69 | | 3669 | 3814 | 3959 | 4103 | 4247 | 4391 | 4535 | 4679 | 4822 |
| 70 | | 5108 | 5251 | 5393 | 5536 | 5678 | 5820 | 5962 | 6103 | 6244 |
| 71 | | 6526 | 6667 | 6808 | 6948 | 7088 | 7228 | 7368 | 7508 | 7647 |
| 72 | | 7925 | 8064 | 8203 | 8341 | 8479 | 8617 | 8755 | 8893 | 9030 |
| 73 | | 9304 | 9441 | 9578 | 9715 | 9851 | 9987 | *0123 | *0259 | *0394 |
| 74 | 6.6 | 0665 | 0800 | 0935 | 1070 | 1204 | 1338 | 1473 | 1607 | 1740 |
| 75 | | 2007 | 2141 | 2274 | 2407 | 2539 | 2672 | 2804 | 2936 | 3068 |
| 76 | | 3332 | 3463 | 3595 | 3726 | 3857 | 3988 | 4118 | 4249 | 4379 |
| 77 | | 4639 | 4769 | 4898 | 5028 | 5157 | 5286 | 5415 | 5544 | 5673 |
| 78 | | 5929 | 6058 | 6185 | 6313 | 6441 | 6568 | 6696 | 6823 | 6950 |
| 79 | | 7203 | 7330 | 7456 | 7582 | 7708 | 7834 | 7960 | 8085 | 8211 |
| 80 | | 8461 | 8586 | 8711 | 8835 | 8960 | 9084 | 9208 | 9332 | 9456 |
| 81 | | 9703 | 9827 | 9950 | *0073 | *0196 | *0319 | *0441 | *0564 | *0686 |
| 82 | 6.7 | 0930 | 1052 | 1174 | 1296 | 1417 | 1538 | 1659 | 1780 | 1901 |
| 83 | | 2143 | 2263 | 2383 | 2503 | 2623 | 2743 | 2863 | 2982 | 3102 |
| 84 | | 3340 | 3459 | 3578 | 3697 | 3815 | 3934 | 4052 | 4170 | 4288 |
| 85 | | 4524 | 4641 | 4759 | 4876 | 4993 | 5110 | 5227 | 5344 | 5460 |
| 86 | | 5693 | 5809 | 5926 | 6041 | 6157 | 6273 | 6388 | 6504 | 6619 |
| 87 | | 6849 | 6964 | 7079 | 7194 | 7308 | 7422 | 7537 | 7651 | 7765 |
| 88 | | 7992 | 8106 | 8219 | 8333 | 8446 | 8559 | 8672 | 8784 | 8897 |
| 89 | | 9122 | 9234 | 9347 | 9459 | 9571 | 9682 | 9794 | 9906 | *0017 |
| 90 | 6.8 | 0239 | 0351 | 0461 | 0572 | 0683 | 0793 | 0904 | 1014 | 1124 |
| 91 | | 1344 | 1454 | 1564 | 1674 | 1783 | 1892 | 2002 | 2111 | 2220 |
| 92 | | 2437 | 2546 | 2655 | 2763 | 2871 | 2979 | 3087 | 3195 | 3303 |
| 93 | | 3518 | 3626 | 3733 | 3841 | 3948 | 4055 | 4162 | 4268 | 4375 |
| 94 | | 4588 | 4694 | 4801 | 4907 | 5013 | 5118 | 5224 | 5330 | 5435 |
| 95 | | 5646 | 5751 | 5857 | 5961 | 6066 | 6171 | 6276 | 6380 | 6485 |
| 96 | | 6693 | 6797 | 6901 | 7005 | 7109 | 7213 | 7316 | 7420 | 7523 |
| 97 | | 7730 | 7833 | 7936 | 8038 | 8141 | 8244 | 8346 | 8449 | 8551 |
| 98 | | 8755 | 8857 | 8959 | 9061 | 9163 | 9264 | 9366 | 9467 | 9568 |
| 99 | | 9770 | 9871 | 9972 | *0073 | *0174 | *0274 | *0375 | *0475 | *0575 |
| 100 | 6.9 | 0776 | 0875 | 0975 | 1075 | 1175 | 1274 | 1374 | 1473 | 1572 |
| 101 | | 1771 | 1870 | 1968 | 2067 | 2166 | 2264 | 2363 | 2461 | 2560 |
| 102 | | 2756 | 2854 | 2952 | 3049 | 3147 | 3245 | 3342 | 3440 | 3537 |
| 103 | | 3731 | 3828 | 3925 | 4022 | 4119 | 4216 | 4312 | 4409 | 4505 |
| 104 | | 4698 | 4794 | 4890 | 4986 | 5081 | 5177 | 5273 | 5368 | 5464 |
| 105 | | 5655 | 5750 | 5845 | 5940 | 6035 | 6130 | 6224 | 6319 | 6414 |
| 106 | | 6602 | 6697 | 6791 | 6885 | 6979 | 7073 | 7167 | 7261 | 7354 |
| 107 | | 7541 | 7635 | 7728 | 7821 | 7915 | 8008 | 8101 | 8193 | 8286 |
| 108 | | 8472 | 8564 | 8657 | 8749 | 8841 | 8934 | 9026 | 9118 | 9210 |
| 109 | | 9393 | 9485 | 9577 | 9668 | 9760 | 9851 | 9942 | *0033 | *0125 |
| 110 | 7.0 | 0307 | 0397 | 0488 | 0579 | 0670 | 0760 | 0851 | 0941 | 1031 |
| N | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

EXPONENTIAL FUNCTIONS

| x | e^x | $\text{Log}_{10}(e^x)$ | e^{-x} | x | e^x | $\text{Log}_{10}(e^x)$ | e^{-x} |
|------|--------|------------------------|----------|------|--------|------------------------|----------|
| 0.00 | 1.0000 | 0.00000 | 1.000000 | 0.50 | 1.6487 | 0.21715 | 0.606531 |
| 0.01 | 1.0101 | .00434 | 0.990050 | 0.51 | 1.6653 | .22149 | .600496 |
| 0.02 | 1.0202 | .00869 | .980199 | 0.52 | 1.6820 | .22583 | .594521 |
| 0.03 | 1.0305 | .01303 | .970446 | 0.53 | 1.6989 | .23018 | .588605 |
| 0.04 | 1.0408 | .01737 | .960789 | 0.54 | 1.7160 | .23452 | .582748 |
| 0.05 | 1.0513 | 0.02171 | 0.951229 | 0.55 | 1.7333 | 0.23896 | 0.576950 |
| 0.06 | 1.0618 | .02606 | .941765 | 0.56 | 1.7507 | .24320 | .571209 |
| 0.07 | 1.0725 | .03040 | .932394 | 0.57 | 1.7683 | .24755 | .565525 |
| 0.08 | 1.0833 | .03474 | .923116 | 0.58 | 1.7860 | .25189 | .559898 |
| 0.09 | 1.0942 | .03909 | .913931 | 0.59 | 1.8040 | .25623 | .554327 |
| 0.10 | 1.1052 | 0.04343 | 0.904837 | 0.60 | 1.8221 | 0.26058 | 0.548812 |
| 0.11 | 1.1163 | .04777 | .895834 | 0.61 | 1.8404 | .26492 | .543351 |
| 0.12 | 1.1275 | .05212 | .886920 | 0.62 | 1.8589 | .26926 | .537944 |
| 0.13 | 1.1388 | .05646 | .878095 | 0.63 | 1.8776 | .27361 | .532592 |
| 0.14 | 1.1503 | .06080 | .869358 | 0.64 | 1.8965 | .27795 | .527292 |
| 0.15 | 1.1618 | 0.06514 | 0.860708 | 0.65 | 1.9155 | 0.28229 | 0.522046 |
| 0.16 | 1.1735 | .06949 | .852144 | 0.66 | 1.9348 | .28663 | .516851 |
| 0.17 | 1.1853 | .07383 | .843665 | 0.67 | 1.9542 | .29098 | .511709 |
| 0.18 | 1.1972 | .07817 | .835270 | 0.68 | 1.9739 | .29532 | .506617 |
| 0.19 | 1.2092 | .08252 | .826959 | 0.69 | 1.9937 | .29966 | .501576 |
| 0.20 | 1.2214 | 0.08686 | 0.818731 | 0.70 | 2.0138 | 0.30401 | 0.496585 |
| 0.21 | 1.2337 | .09120 | .810584 | 0.71 | 2.0340 | .30835 | .491644 |
| 0.22 | 1.2461 | .09554 | .802519 | 0.72 | 2.0544 | .31269 | .486752 |
| 0.23 | 1.2586 | .09989 | .794534 | 0.73 | 2.0751 | .31703 | .481909 |
| 0.24 | 1.2712 | .10423 | .786628 | 0.74 | 2.0959 | .32138 | .477114 |
| 0.25 | 1.2840 | 0.10857 | 0.778801 | 0.75 | 2.1170 | 0.32572 | 0.472367 |
| 0.26 | 1.2969 | .11292 | .771052 | 0.76 | 2.1383 | .33006 | .467666 |
| 0.27 | 1.3100 | .11726 | .763379 | 0.77 | 2.1598 | .33441 | .463013 |
| 0.28 | 1.3231 | .12160 | .755784 | 0.78 | 2.1815 | .33875 | .458406 |
| 0.29 | 1.3364 | .12595 | .748264 | 0.79 | 2.2034 | .34309 | .453845 |
| 0.30 | 1.3499 | 0.13029 | 0.740818 | 0.80 | 2.2255 | 0.34744 | 0.449329 |
| 0.31 | 1.3634 | .13463 | .733447 | 0.81 | 2.2479 | .35178 | .444858 |
| 0.32 | 1.3771 | .13897 | .726149 | 0.82 | 2.2705 | .35612 | .440432 |
| 0.33 | 1.3910 | .14332 | .718924 | 0.83 | 2.2933 | .36046 | .436049 |
| 0.34 | 1.4049 | .14766 | .711770 | 0.84 | 2.3164 | .36481 | .431711 |
| 0.35 | 1.4191 | 0.15200 | 0.704688 | 0.85 | 2.3396 | 0.36915 | 0.427415 |
| 0.36 | 1.4333 | .15635 | .697676 | 0.86 | 2.3632 | .37349 | .423162 |
| 0.37 | 1.4477 | .16069 | .690734 | 0.87 | 2.3869 | .37784 | .418952 |
| 0.38 | 1.4623 | .16503 | .683861 | 0.88 | 2.4109 | .38218 | .414783 |
| 0.39 | 1.4770 | .16937 | .677057 | 0.89 | 2.4351 | .38652 | .410656 |
| 0.40 | 1.4918 | 0.17372 | 0.670320 | 0.90 | 2.4596 | 0.39087 | 0.406570 |
| 0.41 | 1.5068 | .17806 | .663650 | 0.91 | 2.4843 | .39521 | .402524 |
| 0.42 | 1.5220 | .18240 | .657047 | 0.92 | 2.5093 | .39955 | .398519 |
| 0.43 | 1.5373 | .18675 | .650509 | 0.93 | 2.5345 | .40389 | .394554 |
| 0.44 | 1.5527 | .19109 | .644036 | 0.94 | 2.5600 | .40824 | .390628 |
| 0.45 | 1.5683 | 0.19543 | 0.637628 | 0.95 | 2.5857 | 0.41258 | 0.386741 |
| 0.46 | 1.5841 | .19978 | .631284 | 0.96 | 2.6117 | .41692 | .382893 |
| 0.47 | 1.6000 | .20412 | .625002 | 0.97 | 2.6379 | .42127 | .379083 |
| 0.48 | 1.6161 | .20846 | .618783 | 0.98 | 2.6645 | .42561 | .375311 |
| 0.49 | 1.6323 | .21280 | .612626 | 0.99 | 2.6912 | .42995 | .371577 |
| 0.50 | 1.6487 | 0.21715 | 0.606531 | 1.00 | 2.7183 | 0.43429 | 0.367879 |

EXPONENTIAL FUNCTIONS (Continued)

| x | e^x | $\text{Log}_{10}(e^x)$ | e^{-x} | x | e^x | $\text{Log}_{10}(e^x)$ | e^{-x} |
|------|--------|------------------------|----------|------|--------|------------------------|----------|
| 1.00 | 2.7183 | 0.43429 | 0.367879 | 1.50 | 4.4817 | 0.65144 | 0.223130 |
| 1.01 | 2.7456 | .43864 | .364219 | 1.51 | 4.5267 | .65578 | .220910 |
| 1.02 | 2.7732 | .44298 | .360595 | 1.52 | 4.5722 | .66013 | .218712 |
| 1.03 | 2.8011 | .44732 | .357007 | 1.53 | 4.6182 | .66447 | .216536 |
| 1.04 | 2.8292 | .45167 | .353455 | 1.54 | 4.6646 | .66881 | .214381 |
| 1.05 | 2.8577 | 0.45601 | 0.349938 | 1.55 | 4.7115 | 0.67316 | 0.212248 |
| 1.06 | 2.8864 | .46035 | .346456 | 1.56 | 4.7588 | .67750 | .210136 |
| 1.07 | 2.9154 | .46470 | .343009 | 1.57 | 4.8066 | .68184 | .208045 |
| 1.08 | 2.9447 | .46904 | .339596 | 1.58 | 4.8550 | .68619 | .205975 |
| 1.09 | 2.9743 | .47338 | .336216 | 1.59 | 4.9037 | .69053 | .203926 |
| 1.10 | 3.0042 | 0.47772 | 0.332871 | 1.60 | 4.9530 | 0.69487 | 0.201897 |
| 1.11 | 3.0344 | .48207 | .329559 | 1.61 | 5.0028 | .69921 | .199888 |
| 1.12 | 3.0649 | .48641 | .326280 | 1.62 | 5.0531 | .70356 | .197899 |
| 1.13 | 3.0957 | .49075 | .323033 | 1.63 | 5.1039 | .70790 | .195930 |
| 1.14 | 3.1268 | .49510 | .319819 | 1.64 | 5.1552 | .71224 | .193980 |
| 1.15 | 3.1582 | 0.49944 | 0.316637 | 1.65 | 5.2070 | 0.71659 | 0.192050 |
| 1.16 | 3.1899 | .50378 | .313486 | 1.66 | 5.2593 | .72093 | .190139 |
| 1.17 | 3.2220 | .50812 | .310367 | 1.67 | 5.3122 | .72527 | .188247 |
| 1.18 | 3.2544 | .51247 | .307279 | 1.68 | 5.3656 | .72961 | .186374 |
| 1.19 | 3.2871 | .51681 | .304221 | 1.69 | 5.4195 | .73396 | .184520 |
| 1.20 | 3.3201 | 0.52115 | 0.301194 | 1.70 | 5.4739 | 0.73830 | 0.182684 |
| 1.21 | 3.3535 | .52550 | .298197 | 1.71 | 5.5290 | .74264 | .180866 |
| 1.22 | 3.3872 | .52984 | .295230 | 1.72 | 5.5845 | .74699 | .179066 |
| 1.23 | 3.4212 | .53418 | .292293 | 1.73 | 5.6407 | .75133 | .177284 |
| 1.24 | 3.4556 | .53853 | .289384 | 1.74 | 5.6973 | .75567 | .175520 |
| 1.25 | 3.4903 | 0.54287 | 0.286505 | 1.75 | 5.7546 | 0.76002 | 0.173774 |
| 1.26 | 3.5254 | .54721 | .283654 | 1.76 | 5.8124 | .76436 | .172045 |
| 1.27 | 3.5609 | .55155 | .280832 | 1.77 | 5.8709 | .76870 | .170333 |
| 1.28 | 3.5966 | .55590 | .278037 | 1.78 | 5.9299 | .77304 | .168638 |
| 1.29 | 3.6328 | .56024 | .275271 | 1.79 | 5.9895 | .77739 | .166960 |
| 1.30 | 3.6693 | 0.56458 | 0.272532 | 1.80 | 6.0496 | 0.78173 | 0.165299 |
| 1.31 | 3.7062 | .56893 | .269820 | 1.81 | 6.1104 | .78607 | .163654 |
| 1.32 | 3.7434 | .57327 | .267135 | 1.82 | 6.1719 | .79042 | .162026 |
| 1.33 | 3.7810 | .57761 | .264477 | 1.83 | 6.2339 | .79476 | .160414 |
| 1.34 | 3.8190 | .58195 | .261846 | 1.84 | 6.2965 | .79910 | .158817 |
| 1.35 | 3.8574 | 0.58630 | 0.259240 | 1.85 | 6.3598 | 0.80344 | 0.157237 |
| 1.36 | 3.8962 | .59064 | .256661 | 1.86 | 6.4237 | .80779 | .155673 |
| 1.37 | 3.9354 | .59498 | .254107 | 1.87 | 6.4883 | .81213 | .154124 |
| 1.38 | 3.9749 | .59933 | .251579 | 1.88 | 6.5535 | .81647 | .152590 |
| 1.39 | 4.0149 | .60367 | .249075 | 1.89 | 6.6194 | .82082 | .151072 |
| 1.40 | 4.0552 | 0.60801 | 0.246597 | 1.90 | 6.6859 | 0.82516 | 0.149569 |
| 1.41 | 4.0960 | .61236 | .244143 | 1.91 | 6.7531 | .82950 | .148080 |
| 1.42 | 4.1371 | .61670 | .241714 | 1.92 | 6.8210 | .83385 | .146607 |
| 1.43 | 4.1787 | .62104 | .239309 | 1.93 | 6.8895 | .83819 | .145148 |
| 1.44 | 4.2207 | .62538 | .236928 | 1.94 | 6.9588 | .84253 | .143704 |
| 1.45 | 4.2631 | 0.62973 | 0.234570 | 1.95 | 7.0287 | 0.84687 | 0.142274 |
| 1.46 | 4.3060 | .63407 | .232236 | 1.96 | 7.0993 | .85122 | .140858 |
| 1.47 | 4.3492 | .63841 | .229925 | 1.97 | 7.1707 | .85556 | .139457 |
| 1.48 | 4.3929 | .64276 | .227638 | 1.98 | 7.2427 | .85990 | .138069 |
| 1.49 | 4.4371 | .64710 | .225373 | 1.99 | 7.3155 | .86425 | .136695 |
| 1.50 | 4.4817 | 0.65144 | 0.223130 | 2.00 | 7.3891 | 0.86859 | 0.135335 |

EXPONENTIAL FUNCTIONS (Continued)

| x | e^x | $\text{Log}_{10}(e^x)$ | e^{-x} | x | e^x | $\text{Log}_{10}(e^x)$ | e^{-x} |
|-------------|--------|------------------------|----------|-------------|--------|------------------------|----------|
| 2.00 | 7.3891 | 0.86859 | 0.135335 | 2.50 | 12.182 | 1.08574 | 0.082085 |
| 2.01 | 7.4633 | .87293 | .133989 | 2.51 | 12.305 | 1.09008 | .081268 |
| 2.02 | 7.5383 | .87727 | .132655 | 2.52 | 12.429 | 1.09442 | .080460 |
| 2.03 | 7.6141 | .88162 | .131336 | 2.53 | 12.554 | 1.09877 | .079659 |
| 2.04 | 7.6906 | .88596 | .130029 | 2.54 | 12.680 | 1.10311 | .078866 |
| 2.05 | 7.7679 | 0.89030 | 0.128735 | 2.55 | 12.807 | 1.10745 | 0.078082 |
| 2.06 | 7.8460 | .89465 | .127454 | 2.56 | 12.936 | 1.11179 | .077305 |
| 2.07 | 7.9248 | .89899 | .126186 | 2.57 | 13.066 | 1.11614 | .076536 |
| 2.08 | 8.0045 | .90333 | .124930 | 2.58 | 13.197 | 1.12048 | .075774 |
| 2.09 | 8.0849 | .90768 | .123687 | 2.59 | 13.330 | 1.12482 | .075020 |
| 2.10 | 8.1662 | 0.91202 | 0.122456 | 2.60 | 13.464 | 1.12917 | 0.074274 |
| 2.11 | 8.2482 | .91636 | .121238 | 2.61 | 13.599 | 1.13351 | .073535 |
| 2.12 | 8.3311 | .92070 | .120032 | 2.62 | 13.736 | 1.13785 | .072803 |
| 2.13 | 8.4149 | .92505 | .118837 | 2.63 | 13.874 | 1.14219 | .072078 |
| 2.14 | 8.4994 | .92939 | .117655 | 2.64 | 14.013 | 1.14654 | .071361 |
| 2.15 | 8.5849 | 0.93373 | 0.116484 | 2.65 | 14.154 | 1.15088 | 0.070651 |
| 2.16 | 8.6711 | .93808 | .115325 | 2.66 | 14.296 | 1.15522 | .069948 |
| 2.17 | 8.7583 | .94242 | .114178 | 2.67 | 14.440 | 1.15957 | .069252 |
| 2.18 | 8.8463 | .94676 | .113042 | 2.68 | 14.585 | 1.16391 | .068563 |
| 2.19 | 8.9352 | .95110 | .111917 | 2.69 | 14.732 | 1.16825 | .067881 |
| 2.20 | 9.0250 | 0.95545 | 0.110803 | 2.70 | 14.880 | 1.17260 | 0.067206 |
| 2.21 | 9.1157 | .95979 | .109701 | 2.71 | 15.029 | 1.17694 | .066537 |
| 2.22 | 9.2073 | .96413 | .108609 | 2.72 | 15.180 | 1.18128 | .065875 |
| 2.23 | 9.2999 | .96848 | .107528 | 2.73 | 15.333 | 1.18562 | .065219 |
| 2.24 | 9.3933 | .97282 | .106459 | 2.74 | 15.487 | 1.18997 | .064570 |
| 2.25 | 9.4877 | 0.97716 | 0.105399 | 2.75 | 15.643 | 1.19431 | 0.063928 |
| 2.26 | 9.5831 | .98151 | .104350 | 2.76 | 15.800 | 1.19865 | .063292 |
| 2.27 | 9.6794 | .98585 | .103312 | 2.77 | 15.959 | 1.20300 | .062662 |
| 2.28 | 9.7767 | .99019 | .102284 | 2.78 | 16.119 | 1.20734 | .062039 |
| 2.29 | 9.8749 | .99453 | .101266 | 2.79 | 16.281 | 1.21168 | .061421 |
| 2.30 | 9.9742 | 0.99888 | 0.100259 | 2.80 | 16.445 | 1.21602 | 0.060810 |
| 2.31 | 10.074 | 1.00322 | .099261 | 2.81 | 16.610 | 1.22037 | .060205 |
| 2.32 | 10.176 | 1.00756 | .098274 | 2.82 | 16.777 | 1.22471 | .059606 |
| 2.33 | 10.278 | 1.01191 | .097296 | 2.83 | 16.945 | 1.22905 | .059013 |
| 2.34 | 10.381 | 1.01625 | .096328 | 2.84 | 17.116 | 1.23340 | .058426 |
| 2.35 | 10.486 | 1.02059 | 0.095369 | 2.85 | 17.288 | 1.23774 | 0.057844 |
| 2.36 | 10.591 | 1.02493 | .094420 | 2.86 | 17.462 | 1.24208 | .057269 |
| 2.37 | 10.697 | 1.02928 | .093481 | 2.87 | 17.637 | 1.24643 | .056699 |
| 2.38 | 10.805 | 1.03362 | .092551 | 2.88 | 17.814 | 1.25077 | .056135 |
| 2.39 | 10.913 | 1.03796 | .091630 | 2.89 | 17.993 | 1.25511 | .055576 |
| 2.40 | 11.023 | 1.04231 | 0.090718 | 2.90 | 18.174 | 1.25945 | 0.055023 |
| 2.41 | 11.134 | 1.04665 | .089815 | 2.91 | 18.357 | 1.26380 | .054476 |
| 2.42 | 11.246 | 1.05099 | .088922 | 2.92 | 18.541 | 1.26814 | .053934 |
| 2.43 | 11.359 | 1.05534 | .088037 | 2.93 | 18.728 | 1.27248 | .053397 |
| 2.44 | 11.473 | 1.05968 | .087161 | 2.94 | 18.916 | 1.27683 | .052866 |
| 2.45 | 11.588 | 1.06402 | 0.086294 | 2.95 | 19.106 | 1.28117 | 0.052340 |
| 2.46 | 11.705 | 1.06836 | .085435 | 2.96 | 19.298 | 1.28551 | .051819 |
| 2.47 | 11.822 | 1.07271 | .084585 | 2.97 | 19.492 | 1.28985 | .051303 |
| 2.48 | 11.941 | 1.07705 | .083743 | 2.98 | 19.688 | 1.29420 | .050793 |
| 2.49 | 12.061 | 1.08139 | .082910 | 2.99 | 19.886 | 1.29854 | .050287 |
| 2.50 | 12.182 | 1.08574 | 0.082085 | 3.00 | 20.086 | 1.30288 | 0.049787 |

EXPONENTIAL FUNCTIONS (Continued)

| x | e^x | $\text{Log}_{10}(e^x)$ | e^{-x} | x | e^x | $\text{Log}_{10}(e^x)$ | e^{-x} |
|-------------|--------|------------------------|----------|-------------|--------|------------------------|----------|
| 3.00 | 20.086 | 1.30288 | 0.049787 | 3.50 | 33.115 | 1.52003 | 0.030197 |
| 3.01 | 20.287 | 1.30723 | .049292 | 3.51 | 33.448 | 1.52437 | .029897 |
| 3.02 | 20.491 | 1.31157 | .048801 | 3.52 | 33.784 | 1.52872 | .029599 |
| 3.03 | 20.697 | 1.31591 | .048316 | 3.53 | 34.124 | 1.53306 | .029305 |
| 3.04 | 20.905 | 1.32026 | .047835 | 3.54 | 34.467 | 1.53740 | .029013 |
| 3.05 | 21.115 | 1.32460 | 0.047359 | 3.55 | 34.813 | 1.54175 | 0.028725 |
| 3.06 | 21.328 | 1.32894 | .046888 | 3.56 | 35.163 | 1.54609 | .028439 |
| 3.07 | 21.542 | 1.33328 | .046421 | 3.57 | 35.517 | 1.55043 | .028156 |
| 3.08 | 21.758 | 1.33763 | .045959 | 3.58 | 35.874 | 1.55477 | .027876 |
| 3.09 | 21.977 | 1.34197 | .045502 | 3.59 | 36.234 | 1.55912 | .027598 |
| 3.10 | 22.198 | 1.34631 | 0.045049 | 3.60 | 36.598 | 1.56346 | 0.027324 |
| 3.11 | 22.421 | 1.35066 | .044601 | 3.61 | 36.966 | 1.56780 | .027052 |
| 3.12 | 22.646 | 1.35500 | .044157 | 3.62 | 37.338 | 1.57215 | .026783 |
| 3.13 | 22.874 | 1.35934 | .043718 | 3.63 | 37.713 | 1.57649 | .026516 |
| 3.14 | 23.104 | 1.36368 | .043283 | 3.64 | 38.092 | 1.58083 | .026252 |
| 3.15 | 23.336 | 1.36803 | 0.042852 | 3.65 | 38.475 | 1.58517 | 0.025991 |
| 3.16 | 23.571 | 1.37237 | .042426 | 3.66 | 38.861 | 1.58952 | .025733 |
| 3.17 | 23.807 | 1.37671 | .042004 | 3.67 | 39.252 | 1.59386 | .025476 |
| 3.18 | 24.047 | 1.38106 | .041586 | 3.68 | 39.646 | 1.59820 | .025223 |
| 3.19 | 24.288 | 1.38540 | .041172 | 3.69 | 40.045 | 1.60255 | .024972 |
| 3.20 | 24.533 | 1.38974 | 0.040762 | 3.70 | 40.447 | 1.60689 | 0.024724 |
| 3.21 | 24.779 | 1.39409 | .040357 | 3.71 | 40.854 | 1.61123 | .024478 |
| 3.22 | 25.028 | 1.39843 | .039955 | 3.72 | 41.264 | 1.61558 | .024234 |
| 3.23 | 25.280 | 1.40277 | .039557 | 3.73 | 41.679 | 1.61992 | .023993 |
| 3.24 | 25.534 | 1.40711 | .039164 | 3.74 | 42.098 | 1.62426 | .023754 |
| 3.25 | 25.790 | 1.41146 | 0.038774 | 3.75 | 42.521 | 1.62860 | 0.023518 |
| 3.26 | 26.050 | 1.41580 | .038388 | 3.76 | 42.948 | 1.63295 | .023284 |
| 3.27 | 26.311 | 1.42014 | .038006 | 3.77 | 43.380 | 1.63729 | .023052 |
| 3.28 | 26.576 | 1.42449 | .037628 | 3.78 | 43.816 | 1.64163 | .022823 |
| 3.29 | 26.843 | 1.42883 | .037254 | 3.79 | 44.256 | 1.64598 | .022596 |
| 3.30 | 27.113 | 1.43317 | 0.036883 | 3.80 | 44.701 | 1.65032 | 0.022371 |
| 3.31 | 27.385 | 1.43751 | .036516 | 3.81 | 45.150 | 1.65466 | .022148 |
| 3.32 | 27.660 | 1.44186 | .036153 | 3.82 | 45.604 | 1.65900 | .021928 |
| 3.33 | 27.938 | 1.44620 | .035793 | 3.83 | 46.063 | 1.66335 | .021710 |
| 3.34 | 28.219 | 1.45054 | .035437 | 3.84 | 46.525 | 1.66769 | .021494 |
| 3.35 | 28.503 | 1.45489 | 0.035084 | 3.85 | 46.993 | 1.67203 | 0.021280 |
| 3.36 | 28.789 | 1.45923 | .034735 | 3.86 | 47.465 | 1.67638 | .021068 |
| 3.37 | 29.079 | 1.46357 | .034390 | 3.87 | 47.942 | 1.68072 | .020858 |
| 3.38 | 29.371 | 1.46792 | .034047 | 3.88 | 48.424 | 1.68506 | .020651 |
| 3.39 | 29.666 | 1.47226 | .033709 | 3.89 | 48.911 | 1.68941 | .020445 |
| 3.40 | 29.964 | 1.47660 | 0.033373 | 3.90 | 49.402 | 1.69375 | 0.020242 |
| 3.41 | 30.265 | 1.48094 | .033041 | 3.91 | 49.899 | 1.69809 | .020041 |
| 3.42 | 30.569 | 1.48529 | .032712 | 3.92 | 50.400 | 1.70243 | .019841 |
| 3.43 | 30.877 | 1.48963 | .032387 | 3.93 | 50.907 | 1.70678 | .019644 |
| 3.44 | 31.187 | 1.49397 | .032065 | 3.94 | 51.419 | 1.71112 | .019448 |
| 3.45 | 31.500 | 1.49832 | 0.031746 | 3.95 | 51.935 | 1.71546 | 0.019255 |
| 3.46 | 31.817 | 1.50266 | .031430 | 3.96 | 52.457 | 1.71981 | .019063 |
| 3.47 | 32.137 | 1.50700 | .031117 | 3.97 | 52.985 | 1.72415 | .018873 |
| 3.48 | 32.460 | 1.51134 | .030807 | 3.98 | 53.517 | 1.72849 | .018686 |
| 3.49 | 32.786 | 1.51569 | .030501 | 3.99 | 54.055 | 1.73283 | .018500 |
| 3.50 | 33.115 | 1.52003 | 0.030197 | 4.00 | 54.598 | 1.73718 | 0.018316 |

EXPONENTIAL FUNCTIONS (Continued)

| x | e^x | $\text{Log}_{10}(e^x)$ | e^{-x} | x | e^x | $\text{Log}_{10}(e^x)$ | e^{-x} |
|------|--------|------------------------|----------|------|--------|------------------------|----------|
| 4.00 | 54.598 | 1.73718 | 0.018316 | 4.50 | 90.017 | 1.95433 | 0.011109 |
| 4.01 | 55.147 | 1.74152 | .018133 | 4.51 | 90.922 | 1.95867 | .010998 |
| 4.02 | 55.701 | 1.74586 | .017953 | 4.52 | 91.836 | 1.96301 | .010889 |
| 4.03 | 56.261 | 1.75021 | .017774 | 4.53 | 92.759 | 1.96735 | .010781 |
| 4.04 | 56.826 | 1.75455 | .017597 | 4.54 | 93.691 | 1.97170 | .010673 |
| 4.05 | 57.397 | 1.75889 | 0.017422 | 4.55 | 94.632 | 1.97604 | 0.010567 |
| 4.06 | 57.974 | 1.76324 | .017249 | 4.56 | 95.583 | 1.98038 | .010462 |
| 4.07 | 58.557 | 1.76758 | .017077 | 4.57 | 96.544 | 1.98473 | .010358 |
| 4.08 | 59.145 | 1.77192 | .016907 | 4.58 | 97.514 | 1.98907 | .010255 |
| 4.09 | 59.740 | 1.77626 | .016739 | 4.59 | 98.494 | 1.99341 | .010153 |
| 4.10 | 60.340 | 1.78061 | 0.016573 | 4.60 | 99.484 | 1.99775 | 0.010052 |
| 4.11 | 60.947 | 1.78495 | .016408 | 4.61 | 100.48 | 2.00210 | .009952 |
| 4.12 | 61.559 | 1.78929 | .016245 | 4.62 | 101.49 | 2.00644 | .009853 |
| 4.13 | 62.178 | 1.79364 | .016083 | 4.63 | 102.51 | 2.01078 | .009755 |
| 4.14 | 62.803 | 1.79798 | .015923 | 4.64 | 103.54 | 2.01513 | .009658 |
| 4.15 | 63.434 | 1.80232 | 0.015764 | 4.65 | 104.58 | 2.01947 | 0.009562 |
| 4.16 | 64.072 | 1.80667 | .015608 | 4.66 | 105.64 | 2.02381 | .009466 |
| 4.17 | 64.715 | 1.81101 | .015452 | 4.67 | 106.70 | 2.02816 | .009372 |
| 4.18 | 65.366 | 1.81535 | .015299 | 4.68 | 107.77 | 2.03250 | .009279 |
| 4.19 | 66.023 | 1.81969 | .015146 | 4.69 | 108.85 | 2.03684 | .009187 |
| 4.20 | 66.686 | 1.82404 | 0.014996 | 4.70 | 109.95 | 2.04118 | 0.009095 |
| 4.21 | 67.357 | 1.82838 | .014846 | 4.71 | 111.05 | 2.04553 | .009006 |
| 4.22 | 68.033 | 1.83272 | .014699 | 4.72 | 112.17 | 2.04987 | .008915 |
| 4.23 | 68.717 | 1.83707 | .014552 | 4.73 | 113.30 | 2.05421 | .008826 |
| 4.24 | 69.408 | 1.84141 | .014408 | 4.74 | 114.43 | 2.05856 | .008739 |
| 4.25 | 70.105 | 1.84575 | 0.014264 | 4.75 | 115.58 | 2.06290 | 0.008652 |
| 4.26 | 70.810 | 1.85009 | .014122 | 4.76 | 116.75 | 2.06724 | .008566 |
| 4.27 | 71.522 | 1.85444 | .013982 | 4.77 | 117.92 | 2.07158 | .008480 |
| 4.28 | 72.240 | 1.85878 | .013843 | 4.78 | 119.10 | 2.07593 | .008396 |
| 4.29 | 72.966 | 1.86312 | .013705 | 4.79 | 120.30 | 2.08027 | .008312 |
| 4.30 | 73.700 | 1.86747 | 0.013569 | 4.80 | 121.51 | 2.08461 | 0.008230 |
| 4.31 | 74.440 | 1.87181 | .013434 | 4.81 | 122.73 | 2.08896 | .008148 |
| 4.32 | 75.189 | 1.87615 | .013300 | 4.82 | 123.97 | 2.09330 | .008067 |
| 4.33 | 75.944 | 1.88050 | .013168 | 4.83 | 125.21 | 2.09764 | .007987 |
| 4.34 | 76.708 | 1.88484 | .013037 | 4.84 | 126.47 | 2.10199 | .007907 |
| 4.35 | 77.478 | 1.88918 | 0.012907 | 4.85 | 127.74 | 2.10633 | 0.007828 |
| 4.36 | 78.257 | 1.89352 | .012778 | 4.86 | 129.02 | 2.11067 | .007750 |
| 4.37 | 79.044 | 1.89787 | .012651 | 4.87 | 130.32 | 2.11501 | .007673 |
| 4.38 | 79.838 | 1.90221 | .012525 | 4.88 | 131.63 | 2.11936 | .007597 |
| 4.39 | 80.640 | 1.90655 | .012401 | 4.89 | 132.95 | 2.12370 | .007521 |
| 4.40 | 81.451 | 1.91090 | 0.012277 | 4.90 | 134.29 | 2.12804 | 0.007447 |
| 4.41 | 82.269 | 1.91524 | .012155 | 4.91 | 135.64 | 2.13239 | .007372 |
| 4.42 | 83.096 | 1.91958 | .012034 | 4.92 | 137.00 | 2.13673 | .007299 |
| 4.43 | 83.931 | 1.92392 | .011914 | 4.93 | 138.38 | 2.14107 | .007227 |
| 4.44 | 84.775 | 1.92827 | .011796 | 4.94 | 139.77 | 2.14541 | .007155 |
| 4.45 | 85.627 | 1.93261 | 0.011679 | 4.95 | 141.17 | 2.14976 | 0.007083 |
| 4.46 | 86.488 | 1.93695 | .011562 | 4.96 | 142.59 | 2.15410 | .007013 |
| 4.47 | 87.357 | 1.94130 | .011447 | 4.97 | 144.03 | 2.15844 | .006943 |
| 4.48 | 88.235 | 1.94564 | .011333 | 4.98 | 145.47 | 2.16279 | .006874 |
| 4.49 | 89.121 | 1.94998 | .011221 | 4.99 | 146.94 | 2.16713 | .006806 |
| 4.50 | 90.017 | 1.95433 | 0.011109 | 5.00 | 148.41 | 2.17147 | 0.006738 |

EXPONENTIAL FUNCTIONS (Continued)

| x | e^x | $\text{Log}_{10}(e^x)$ | e^{-x} | x | e^x | $\text{Log}_{10}(e^x)$ | e^{-x} |
|-------------|--------|------------------------|----------|-------------|--------|------------------------|----------|
| 5.00 | 148.41 | 2.17147 | 0.006738 | 5.0 | 148.41 | 2.17147 | 0.006738 |
| 5.01 | 149.90 | 2.17582 | .006671 | 5.1 | 164.02 | 2.21490 | .006097 |
| 5.02 | 151.41 | 2.18016 | .006605 | 5.2 | 181.27 | 2.25833 | .005517 |
| 5.03 | 152.93 | 2.18450 | .006539 | 5.3 | 200.34 | 2.30176 | .004992 |
| 5.04 | 154.47 | 2.18884 | .006474 | 5.4 | 221.41 | 2.34519 | .004517 |
| 5.05 | 156.02 | 2.19319 | 0.006409 | 5.5 | 244.69 | 2.38862 | 0.004087 |
| 5.06 | 157.59 | 2.19753 | .006346 | 5.6 | 270.43 | 2.43205 | .003698 |
| 5.07 | 159.17 | 2.20187 | .006282 | 5.7 | 298.87 | 2.47548 | .003346 |
| 5.08 | 160.77 | 2.20622 | .006220 | 5.8 | 330.30 | 2.51891 | .003028 |
| 5.09 | 162.39 | 2.21056 | .006158 | 5.9 | 365.04 | 2.56234 | .002739 |
| 5.10 | 164.02 | 2.21490 | 0.006097 | 6.0 | 403.43 | 2.60577 | 0.002479 |
| 5.11 | 165.67 | 2.21924 | .006036 | 6.1 | 445.86 | 2.64920 | .002243 |
| 5.12 | 167.34 | 2.22359 | .005976 | 6.2 | 492.75 | 2.69263 | .002029 |
| 5.13 | 169.02 | 2.22793 | .005917 | 6.3 | 544.57 | 2.73606 | .001836 |
| 5.14 | 170.72 | 2.23227 | .005858 | 6.4 | 601.85 | 2.77948 | .001662 |
| 5.15 | 172.43 | 2.23662 | 0.005799 | 6.5 | 665.14 | 2.82291 | 0.001503 |
| 5.16 | 174.16 | 2.24096 | .005742 | 6.6 | 735.10 | 2.86634 | .001360 |
| 5.17 | 175.91 | 2.24530 | .005685 | 6.7 | 812.41 | 2.90977 | .001231 |
| 5.18 | 177.68 | 2.24965 | .005628 | 6.8 | 897.85 | 2.95320 | .001114 |
| 5.19 | 179.47 | 2.25399 | .005572 | 6.9 | 992.27 | 2.99663 | .001008 |
| 5.20 | 181.27 | 2.25833 | 0.005517 | 7.0 | 1096.6 | 3.04006 | 0.000912 |
| 5.21 | 183.09 | 2.26267 | .005462 | 7.1 | 1212.0 | 3.08349 | .000825 |
| 5.22 | 184.93 | 2.26702 | .005407 | 7.2 | 1339.4 | 3.12692 | .000747 |
| 5.23 | 186.79 | 2.27136 | .005354 | 7.3 | 1480.3 | 3.17035 | .000676 |
| 5.24 | 188.67 | 2.27570 | .005300 | 7.4 | 1636.0 | 3.21378 | .000611 |
| 5.25 | 190.57 | 2.28005 | 0.005248 | 7.5 | 1808.0 | 3.25721 | 0.000553 |
| 5.26 | 192.48 | 2.28439 | .005195 | 7.6 | 1998.2 | 3.30064 | .000500 |
| 5.27 | 194.42 | 2.28873 | .005144 | 7.7 | 2208.3 | 3.34407 | .000453 |
| 5.28 | 196.37 | 2.29307 | .005092 | 7.8 | 2440.6 | 3.38750 | .000410 |
| 5.29 | 198.34 | 2.29742 | .005042 | 7.9 | 2697.3 | 3.43093 | .000371 |
| 5.30 | 200.34 | 2.30176 | 0.004992 | 8.0 | 2981.0 | 3.47436 | 0.000335 |
| 5.31 | 202.35 | 2.30610 | .004942 | 8.1 | 3294.5 | 3.51779 | .000304 |
| 5.32 | 204.38 | 2.31045 | .004893 | 8.2 | 3641.0 | 3.56121 | .000275 |
| 5.33 | 206.44 | 2.31479 | .004844 | 8.3 | 4023.9 | 3.60464 | .000249 |
| 5.34 | 208.51 | 2.31913 | .004796 | 8.4 | 4447.1 | 3.64807 | .000225 |
| 5.35 | 210.61 | 2.32348 | 0.004748 | 8.5 | 4914.8 | 3.69150 | 0.000203 |
| 5.36 | 212.72 | 2.32782 | .004701 | 8.6 | 5431.7 | 3.73493 | .000184 |
| 5.37 | 214.86 | 2.33216 | .004654 | 8.7 | 6002.9 | 3.77836 | .000167 |
| 5.38 | 217.02 | 2.33650 | .004608 | 8.8 | 6634.2 | 3.82179 | .000151 |
| 5.39 | 219.20 | 2.34085 | .004562 | 8.9 | 7332.0 | 3.86522 | .000136 |
| 5.40 | 221.41 | 2.34519 | 0.004517 | 9.0 | 8103.1 | 3.90865 | 0.000123 |
| 5.41 | 223.63 | 2.34953 | .004472 | 9.1 | 8955.3 | 3.95208 | .000112 |
| 5.42 | 225.88 | 2.35388 | .004427 | 9.2 | 9897.1 | 3.99551 | .000101 |
| 5.43 | 228.15 | 2.35822 | .004383 | 9.3 | 10938 | 4.03894 | .000091 |
| 5.44 | 230.44 | 2.36256 | .004339 | 9.4 | 12088 | 4.08237 | .000083 |
| 5.45 | 232.76 | 2.36690 | 0.004296 | 9.5 | 13360 | 4.12580 | 0.000075 |
| 5.46 | 235.10 | 2.37125 | .004254 | 9.6 | 14765 | 4.16923 | .000068 |
| 5.47 | 237.46 | 2.37559 | .004211 | 9.7 | 16318 | 4.21266 | .000061 |
| 5.48 | 239.85 | 2.37993 | .004169 | 9.8 | 18034 | 4.25609 | .000055 |
| 5.49 | 242.26 | 2.38428 | .004128 | 9.9 | 19930 | 4.29952 | .000050 |
| 5.50 | 244.69 | 2.38862 | 0.004087 | 10.0 | 22026 | 4.34294 | 0.000045 |

HYPERBOLIC FUNCTIONS

The logarithms given below show the mantissa only. The proper characteristic must be added.

| x | Sinh x | | Cosh x | | Tanh x | | Coth x | |
|-------------|----------|-------------------|----------|-------------------|----------|-------------------|----------|-------------------|
| | Value | log ₁₀ | Value | log ₁₀ | Value | log ₁₀ | Value | log ₁₀ |
| 0.00 | 0.00000 | — ∞ | 1.00000 | .00000 | 0.00000 | — ∞ | ∞ | ∞ |
| 0.01 | .01000 | .00001 | 1.00005 | .00002 | .01000 | .99999 | 100.003 | .00001 |
| 0.02 | .02000 | .30106 | 1.00020 | .00009 | .02000 | .30097 | 50.007 | .69903 |
| 0.03 | .03000 | .47719 | 1.00045 | .00020 | .02999 | .47699 | 33.343 | .52301 |
| 0.04 | .04001 | .60218 | 1.00080 | .00035 | .03998 | .60183 | 25.013 | .39817 |
| 0.05 | 0.05002 | .69915 | 1.00125 | .00054 | 0.04993 | .69861 | 20.017 | .30139 |
| 0.06 | .06004 | .77841 | 1.00180 | .00078 | .05993 | .77763 | 16.687 | .22237 |
| 0.07 | .07006 | .84545 | 1.00245 | .00106 | .06989 | .84439 | 14.309 | .15561 |
| 0.08 | .08009 | .90355 | 1.00320 | .00139 | .07983 | .90216 | 12.527 | .09784 |
| 0.09 | .09012 | .95483 | 1.00405 | .00176 | .08976 | .95307 | 11.141 | .04693 |
| 0.10 | 0.10017 | .00072 | 1.00500 | .00217 | 0.09967 | .99856 | 10.0333 | .00144 |
| 0.11 | .11022 | .04227 | 1.00606 | .00262 | .10956 | .00265 | 9.1275 | .96035 |
| 0.12 | .12029 | .08022 | 1.00721 | .00312 | .11943 | .07710 | 8.3733 | .92290 |
| 0.13 | .13037 | .11517 | 1.00846 | .00366 | .12927 | .11151 | 7.7356 | .88849 |
| 0.14 | .14046 | .14755 | 1.00932 | .00424 | .13909 | .14330 | 7.1895 | .85670 |
| 0.15 | 0.15056 | .17772 | 1.01127 | .00487 | 0.14889 | .17285 | 6.7166 | .82715 |
| 0.16 | .16068 | .20597 | 1.01283 | .00554 | .15865 | .20044 | 6.3032 | .79956 |
| 0.17 | .17082 | .23254 | 1.01448 | .00625 | .16838 | .22629 | 5.9389 | .77371 |
| 0.18 | .18097 | .25762 | 1.01624 | .00700 | .17808 | .25062 | 5.6154 | .74938 |
| 0.19 | .19115 | .28136 | 1.01810 | .00779 | .18775 | .27357 | 5.3263 | .72643 |
| 0.20 | 0.20134 | .30392 | 1.02007 | .00863 | 0.19738 | .29529 | 5.0665 | .70471 |
| 0.21 | .21155 | .32541 | 1.02213 | .00951 | .20697 | .31590 | 4.8317 | .68410 |
| 0.22 | .22178 | .34592 | 1.02430 | .01043 | .21652 | .33549 | 4.6186 | .66451 |
| 0.23 | .23203 | .36555 | 1.02657 | .01139 | .22603 | .35416 | 4.4242 | .64584 |
| 0.24 | .24231 | .38437 | 1.02894 | .01239 | .23550 | .37198 | 4.2464 | .62802 |
| 0.25 | 0.25261 | .40245 | 1.03141 | .01343 | 0.24492 | .38902 | 4.0830 | .61098 |
| 0.26 | .26294 | .41986 | 1.03399 | .01452 | .25430 | .40534 | 3.9324 | .59466 |
| 0.27 | .27329 | .43663 | 1.03667 | .01564 | .26362 | .42099 | 3.7933 | .57901 |
| 0.28 | .28367 | .45282 | 1.03946 | .01681 | .27291 | .43601 | 3.6643 | .56399 |
| 0.29 | .29408 | .46847 | 1.04235 | .01801 | .28213 | .45046 | 3.5444 | .54954 |
| 0.30 | 0.30452 | .48362 | 1.04534 | .01926 | 0.29131 | .46436 | 3.4327 | .53564 |
| 0.31 | .31499 | .49830 | 1.04844 | .02054 | .30044 | .47775 | 3.3285 | .52225 |
| 0.32 | .32549 | .51254 | 1.05164 | .02187 | .30951 | .49067 | 3.2309 | .50933 |
| 0.33 | .33602 | .52637 | 1.05495 | .02323 | .31852 | .50314 | 3.1395 | .49686 |
| 0.34 | .34659 | .53981 | 1.05836 | .02463 | .32748 | .51518 | 3.0536 | .48482 |
| 0.35 | 0.35719 | .55290 | 1.06188 | .02607 | 0.33638 | .52682 | 2.9729 | .47318 |
| 0.36 | .36783 | .56564 | 1.06550 | .02755 | .34521 | .53809 | 2.8968 | .46191 |
| 0.37 | .37850 | .57807 | 1.06923 | .02907 | .35399 | .54899 | 2.8249 | .45101 |
| 0.38 | .38921 | .59019 | 1.07307 | .03063 | .36271 | .55956 | 2.7570 | .44044 |
| 0.39 | .39996 | .60202 | 1.07702 | .03222 | .37136 | .56980 | 2.6928 | .43020 |
| 0.40 | 0.41075 | .61358 | 1.08107 | .03385 | 0.37995 | .57973 | 2.6319 | .42027 |
| 0.41 | .42158 | .62488 | 1.08523 | .03552 | .38847 | .58936 | 2.5742 | .41064 |
| 0.42 | .43246 | .63594 | 1.08950 | .03723 | .39693 | .59871 | 2.5193 | .40129 |
| 0.43 | .44337 | .64677 | 1.09388 | .03897 | .40532 | .60780 | 2.4672 | .39220 |
| 0.44 | .45434 | .65738 | 1.09837 | .04075 | .41364 | .61663 | 2.4175 | .38337 |
| 0.45 | 0.46534 | .66777 | 1.10297 | .04256 | 0.42190 | .62521 | 2.3702 | .37479 |
| 0.46 | .47640 | .67797 | 1.10768 | .04441 | .43008 | .63355 | 2.3251 | .36645 |
| 0.47 | .48750 | .68797 | 1.11250 | .04630 | .43820 | .64167 | 2.2821 | .35833 |
| 0.48 | .49865 | .69779 | 1.11743 | .04822 | .44624 | .64957 | 2.2409 | .35043 |
| 0.49 | .50984 | .70744 | 1.12247 | .05018 | .45422 | .65726 | 2.2016 | .34274 |

HYPERBOLIC FUNCTIONS (Continued)

The logarithms given below show the mantissa only. The proper characteristic must be added.

| x | Sinh x | | Cosh x | | Tanh x | | Coth x | |
|-------------|----------|-------------|----------|-------------|----------|-------------|----------|-------------|
| | Value | \log_{10} | Value | \log_{10} | Value | \log_{10} | Value | \log_{10} |
| 0.50 | 0.52110 | .71692 | 1.12763 | .05217 | 0.46212 | .66475 | 2.1640 | .33525 |
| 0.51 | .53240 | .72624 | 1.13289 | .05419 | .46995 | .67205 | 2.1279 | .32795 |
| 0.52 | .54375 | .73540 | 1.13827 | .05625 | .47770 | .67916 | 2.0934 | .32084 |
| 0.53 | .55516 | .74442 | 1.14377 | .05834 | .48538 | .68608 | 2.0602 | .31392 |
| 0.54 | .56663 | .75330 | 1.14938 | .06046 | .49299 | .69284 | 2.0284 | .30716 |
| 0.55 | 0.57815 | .76204 | 1.15510 | .06262 | 0.50052 | .69942 | 1.9979 | .30058 |
| 0.56 | .58973 | .77065 | 1.16094 | .06481 | .50798 | .70584 | 1.9686 | .29416 |
| 0.57 | .60137 | .77914 | 1.16690 | .06703 | .51536 | .71211 | 1.9404 | .28789 |
| 0.58 | .61307 | .78751 | 1.17297 | .06929 | .52267 | .71822 | 1.9133 | .28178 |
| 0.59 | .62483 | .79576 | 1.17916 | .07157 | .52990 | .72419 | 1.8872 | .27581 |
| 0.60 | 0.63665 | .80390 | 1.18547 | .07389 | 0.53705 | .73001 | 1.8620 | .26999 |
| 0.61 | .64854 | .81194 | 1.19189 | .07624 | .54413 | .73570 | 1.8378 | .26430 |
| 0.62 | .66049 | .81987 | 1.19844 | .07861 | .55113 | .74125 | 1.8145 | .25875 |
| 0.63 | .67251 | .82770 | 1.20510 | .08102 | .55805 | .74667 | 1.7919 | .25333 |
| 0.64 | .68459 | .83543 | 1.21189 | .08346 | .56490 | .75197 | 1.7702 | .24803 |
| 0.65 | 0.69675 | .84308 | 1.21879 | .08593 | 0.57167 | .75715 | 1.7493 | .24285 |
| 0.66 | .70897 | .85063 | 1.22582 | .08843 | .57836 | .76220 | 1.7290 | .23780 |
| 0.67 | .72126 | .85809 | 1.23297 | .09095 | .58498 | .76714 | 1.7095 | .23286 |
| 0.68 | .73363 | .86548 | 1.24025 | .09351 | .59152 | .77197 | 1.6906 | .22803 |
| 0.69 | .74607 | .87278 | 1.24765 | .09609 | .59798 | .77669 | 1.6723 | .22331 |
| 0.70 | 0.75858 | .88000 | 1.25517 | .09870 | 0.60437 | .78130 | 1.6546 | .21870 |
| 0.71 | .77117 | .88715 | 1.26282 | .10134 | .61068 | .78581 | 1.6375 | .21419 |
| 0.72 | .78384 | .89423 | 1.27059 | .10401 | .61691 | .79022 | 1.6210 | .20978 |
| 0.73 | .79659 | .90123 | 1.27849 | .10670 | .62307 | .79453 | 1.6050 | .20547 |
| 0.74 | .80941 | .90817 | 1.28652 | .10942 | .62915 | .79875 | 1.5895 | .20125 |
| 0.75 | 0.82232 | .91504 | 1.29468 | .11216 | 0.63515 | .80288 | 1.5744 | .19712 |
| 0.76 | .83530 | .92185 | 1.30297 | .11493 | .64108 | .80691 | 1.5599 | .19309 |
| 0.77 | .84838 | .92859 | 1.31139 | .11773 | .64693 | .81086 | 1.5458 | .18914 |
| 0.78 | .86153 | .93527 | 1.31994 | .12055 | .65271 | .81472 | 1.5321 | .18528 |
| 0.79 | .87478 | .94190 | 1.32862 | .12340 | .65841 | .81850 | 1.5188 | .18150 |
| 0.80 | 0.88811 | .94846 | 1.33743 | .12627 | 0.66404 | .82219 | 1.5059 | .17781 |
| 0.81 | .90152 | .95498 | 1.34638 | .12917 | .66959 | .82581 | 1.4935 | .17419 |
| 0.82 | .91503 | .96144 | 1.35547 | .13209 | .67507 | .82935 | 1.4813 | .17065 |
| 0.83 | .92863 | .96784 | 1.36468 | .13503 | .68048 | .83281 | 1.4696 | .16719 |
| 0.84 | .94233 | .97420 | 1.37404 | .13800 | .68581 | .83620 | 1.4581 | .16380 |
| 0.85 | 0.95612 | .98051 | 1.38353 | .14099 | 0.69107 | .83952 | 1.4470 | .16048 |
| 0.86 | .97000 | .98677 | 1.39316 | .14400 | .69626 | .84277 | 1.4362 | .15723 |
| 0.87 | .98398 | .99299 | 1.40293 | .14704 | .70137 | .84595 | 1.4258 | .15405 |
| 0.88 | .99806 | .99916 | 1.41284 | .15009 | .70642 | .84906 | 1.4156 | .15094 |
| 0.89 | 1.01224 | .00528 | 1.42289 | .15317 | .71139 | .85211 | 1.4057 | .14789 |
| 0.90 | 1.02652 | .01137 | 1.43309 | .15627 | 0.71630 | .85509 | 1.3961 | .14491 |
| 0.91 | 1.04090 | .01741 | 1.44342 | .15939 | .72113 | .85801 | 1.3867 | .14199 |
| 0.92 | 1.05539 | .02341 | 1.45390 | .16254 | .72590 | .86088 | 1.3776 | .13912 |
| 0.93 | 1.06998 | .02937 | 1.46453 | .16570 | .73059 | .86368 | 1.3687 | .13632 |
| 0.94 | 1.08468 | .03530 | 1.47530 | .16888 | .73522 | .86642 | 1.3601 | .13358 |
| 0.95 | 1.09948 | .04119 | 1.48623 | .17208 | 0.73978 | .86910 | 1.3517 | .13090 |
| 0.96 | 1.11440 | .04704 | 1.49729 | .17531 | .74428 | .87173 | 1.3436 | .12827 |
| 0.97 | 1.12943 | .05286 | 1.50851 | .17855 | .74870 | .87431 | 1.3356 | .12569 |
| 0.98 | 1.14457 | .05864 | 1.51988 | .18181 | .75307 | .87683 | 1.3279 | .12317 |
| 0.99 | 1.15983 | .06439 | 1.53141 | .18509 | .75736 | .87930 | 1.3204 | .12070 |

HYPERBOLIC FUNCTIONS (Continued)

The logarithms given below show the mantissa only. The proper characteristic must be added.

| x | Sinh x | | Cosh x | | Tanh x | | Coth x | |
|------|---------|-------------------|---------|-------------------|---------|-------------------|--------|-------------------|
| | Value | log ₁₀ | Value | log ₁₀ | Value | log ₁₀ | Value | log ₁₀ |
| 1.00 | 1.17520 | .07011 | 1.54308 | .18839 | 0.76159 | .88172 | 1.3130 | .11828 |
| 1.01 | 1.19069 | .07580 | 1.55491 | .19171 | .76576 | .88409 | 1.3059 | .11591 |
| 1.02 | 1.20630 | .08146 | 1.56689 | .19504 | .76987 | .88642 | 1.2989 | .11358 |
| 1.03 | 1.22203 | .08708 | 1.57904 | .19839 | .77391 | .88869 | 1.2921 | .11131 |
| 1.04 | 1.23788 | .09268 | 1.59134 | .20176 | .77789 | .89092 | 1.2855 | .10908 |
| 1.05 | 1.25386 | .09825 | 1.60379 | .20515 | 0.78181 | .89310 | 1.2791 | .10690 |
| 1.06 | 1.26996 | .10379 | 1.61641 | .20855 | .78566 | .89524 | 1.2728 | .10476 |
| 1.07 | 1.28619 | .10930 | 1.62919 | .21197 | .78946 | .89733 | 1.2667 | .10267 |
| 1.08 | 1.30254 | .11479 | 1.64214 | .21541 | .79320 | .89938 | 1.2607 | .10062 |
| 1.09 | 1.31903 | .12025 | 1.65525 | .21886 | .79688 | .90139 | 1.2549 | .09861 |
| 1.10 | 1.33565 | .12569 | 1.66852 | .22233 | 0.80050 | .90336 | 1.2492 | .09664 |
| 1.11 | 1.35240 | .13111 | 1.68196 | .22582 | .80406 | .90529 | 1.2437 | .09471 |
| 1.12 | 1.36929 | .13649 | 1.69557 | .22931 | .80757 | .90718 | 1.2383 | .09282 |
| 1.13 | 1.38631 | .14186 | 1.70934 | .23283 | .81102 | .90903 | 1.2330 | .09097 |
| 1.14 | 1.40347 | .14720 | 1.72329 | .23636 | .81441 | .91085 | 1.2279 | .08915 |
| 1.15 | 1.42078 | .15253 | 1.73741 | .23990 | 0.81775 | .91262 | 1.2229 | .08738 |
| 1.16 | 1.43822 | .15783 | 1.75171 | .24346 | .82104 | .91436 | 1.2180 | .08564 |
| 1.17 | 1.45581 | .16311 | 1.76618 | .24703 | .82427 | .91607 | 1.2132 | .08393 |
| 1.18 | 1.47355 | .16836 | 1.78083 | .25062 | .82745 | .91774 | 1.2085 | .08226 |
| 1.19 | 1.49143 | .17360 | 1.79565 | .25422 | .83058 | .91938 | 1.2040 | .08062 |
| 1.20 | 1.50946 | .17882 | 1.81066 | .25784 | 0.83365 | .92099 | 1.1995 | .07901 |
| 1.21 | 1.52764 | .18402 | 1.82584 | .26146 | .83668 | .92256 | 1.1952 | .07744 |
| 1.22 | 1.54598 | .18920 | 1.84121 | .26510 | .83965 | .92410 | 1.1910 | .07590 |
| 1.23 | 1.56447 | .19437 | 1.85676 | .26876 | .84258 | .92561 | 1.1868 | .07439 |
| 1.24 | 1.58311 | .19951 | 1.87250 | .27242 | .84546 | .92709 | 1.1828 | .07291 |
| 1.25 | 1.60192 | .20464 | 1.88842 | .27610 | 0.84828 | .92854 | 1.1789 | .07146 |
| 1.26 | 1.62088 | .20975 | 1.90454 | .27979 | .85105 | .92996 | 1.1750 | .07004 |
| 1.27 | 1.64001 | .21485 | 1.92084 | .28349 | .85380 | .93135 | 1.1712 | .06865 |
| 1.28 | 1.65930 | .21993 | 1.93734 | .28721 | .85648 | .93272 | 1.1676 | .06728 |
| 1.29 | 1.67876 | .22499 | 1.95403 | .29093 | .85913 | .93406 | 1.1640 | .06594 |
| 1.30 | 1.69838 | .23004 | 1.97091 | .29467 | 0.86172 | .93537 | 1.1605 | .06463 |
| 1.31 | 1.71818 | .23507 | 1.98800 | .29842 | .86428 | .93665 | 1.1570 | .06335 |
| 1.32 | 1.73814 | .24009 | 2.00528 | .30217 | .86678 | .93791 | 1.1537 | .06209 |
| 1.33 | 1.75828 | .24509 | 2.02276 | .30594 | .86925 | .93914 | 1.1504 | .06086 |
| 1.34 | 1.77860 | .25008 | 2.04044 | .30972 | .87167 | .94035 | 1.1472 | .05963 |
| 1.35 | 1.79909 | .25505 | 2.05833 | .31352 | 0.87405 | .94154 | 1.1441 | .05846 |
| 1.36 | 1.81977 | .26002 | 2.07643 | .31732 | .87639 | .94270 | 1.1410 | .05730 |
| 1.37 | 1.84062 | .26496 | 2.09473 | .32113 | .87869 | .94384 | 1.1381 | .05616 |
| 1.38 | 1.86166 | .26990 | 2.11324 | .32495 | .88095 | .94495 | 1.1351 | .05506 |
| 1.39 | 1.88289 | .27482 | 2.13196 | .32878 | .88317 | .94604 | 1.1323 | .05396 |
| 1.40 | 1.90430 | .27974 | 2.15090 | .33262 | 0.88535 | .94712 | 1.1295 | .05288 |
| 1.41 | 1.92591 | .28464 | 2.17005 | .33647 | .88749 | .94817 | 1.1268 | .05183 |
| 1.42 | 1.94770 | .28952 | 2.18942 | .34033 | .88960 | .94919 | 1.1241 | .05081 |
| 1.43 | 1.96970 | .29440 | 2.20900 | .34420 | .89167 | .95020 | 1.1215 | .04980 |
| 1.44 | 1.99188 | .29926 | 2.22881 | .34807 | .89370 | .95119 | 1.1189 | .04881 |
| 1.45 | 2.01427 | .30412 | 2.24884 | .35196 | 0.89569 | .95216 | 1.1165 | .04784 |
| 1.46 | 2.03686 | .30896 | 2.26910 | .35586 | .89765 | .95311 | 1.1140 | .04689 |
| 1.47 | 2.05965 | .31379 | 2.28958 | .35976 | .89958 | .95404 | 1.1116 | .04596 |
| 1.48 | 2.08265 | .31862 | 2.31029 | .36367 | .90147 | .95495 | 1.1093 | .04505 |
| 1.49 | 2.10586 | .32343 | 2.33123 | .36759 | .90332 | .95584 | 1.1070 | .04416 |

HYPERBOLIC FUNCTIONS (Continued)

The logarithms given below show the mantissa only. The proper characteristic must be added.

| x | Sinh x | | Cosh x | | Tanh x | | Coth x | |
|-------------|----------|-------------------|----------|-------------------|----------|-------------------|----------|-------------------|
| | Value | log ₁₀ | Value | log ₁₀ | Value | log ₁₀ | Value | log ₁₀ |
| 1.50 | 2.12928 | .32823 | 2.35241 | .37151 | 0.90515 | .95672 | 1.1048 | .04328 |
| 1.51 | 2.15291 | .33303 | 2.37382 | .37545 | .90694 | .95758 | 1.1026 | .04242 |
| 1.52 | 2.17676 | .33781 | 2.39547 | .37939 | .90870 | .95842 | 1.1005 | .04158 |
| 1.53 | 2.20082 | .34258 | 2.41736 | .38334 | .91042 | .95924 | 1.0984 | .04076 |
| 1.54 | 2.22510 | .34735 | 2.43949 | .38730 | .91212 | .96005 | 1.0963 | .03995 |
| 1.55 | 2.24961 | .35211 | 2.46186 | .39126 | 0.91379 | .96084 | 1.0943 | .03916 |
| 1.56 | 2.27434 | .35686 | 2.48448 | .39524 | .91542 | .96162 | 1.0924 | .03838 |
| 1.57 | 2.29930 | .36160 | 2.50735 | .39921 | .91703 | .96238 | 1.0905 | .03762 |
| 1.58 | 2.32449 | .36633 | 2.53047 | .40320 | .91860 | .96313 | 1.0886 | .03687 |
| 1.59 | 2.34991 | .37105 | 2.55384 | .40719 | .92015 | .96386 | 1.0868 | .03614 |
| 1.60 | 2.37557 | .37577 | 2.57746 | .41119 | 0.92167 | .96457 | 1.0850 | .03543 |
| 1.61 | 2.40146 | .38048 | 2.60135 | .41520 | .92316 | .96528 | 1.0832 | .03472 |
| 1.62 | 2.42760 | .38518 | 2.62549 | .41921 | .92462 | .96597 | 1.0815 | .03403 |
| 1.63 | 2.45397 | .38987 | 2.64990 | .42323 | .92606 | .96664 | 1.0798 | .03336 |
| 1.64 | 2.48059 | .39456 | 2.67457 | .42725 | .92747 | .96730 | 1.0782 | .03270 |
| 1.65 | 2.50746 | .39923 | 2.69951 | .43129 | 0.92886 | .96795 | 1.0766 | .03205 |
| 1.66 | 2.53459 | .40391 | 2.72472 | .43532 | .93022 | .96858 | 1.0750 | .03142 |
| 1.67 | 2.56196 | .40857 | 2.75021 | .43937 | .93155 | .96921 | 1.0735 | .03079 |
| 1.68 | 2.58959 | .41323 | 2.77596 | .44341 | .93286 | .96982 | 1.0720 | .03018 |
| 1.69 | 2.61748 | .41788 | 2.80200 | .44747 | .93415 | .97042 | 1.0705 | .02958 |
| 1.70 | 2.64563 | .42253 | 2.82832 | .45153 | .93541 | .97100 | 1.0691 | .02900 |
| 1.71 | 2.67405 | .42717 | 2.85491 | .45559 | .93665 | .97158 | 1.0676 | .02842 |
| 1.72 | 2.70273 | .43180 | 2.88180 | .45966 | .93786 | .97214 | 1.0663 | .02786 |
| 1.73 | 2.73168 | .43643 | 2.90897 | .46374 | .93906 | .97269 | 1.0649 | .02731 |
| 1.74 | 2.76091 | .44105 | 2.93643 | .46782 | .94023 | .97323 | 1.0636 | .02677 |
| 1.75 | 2.79041 | .44567 | 2.96419 | .47191 | 0.94138 | .97376 | 1.0623 | .02624 |
| 1.76 | 2.82020 | .45028 | 2.99224 | .47600 | .94250 | .97428 | 1.0610 | .02572 |
| 1.77 | 2.85026 | .45488 | 3.02059 | .48009 | .94361 | .97479 | 1.0598 | .02521 |
| 1.78 | 2.88061 | .45948 | 3.04925 | .48419 | .94470 | .97529 | 1.0585 | .02471 |
| 1.79 | 2.91125 | .46408 | 3.07821 | .48830 | .94576 | .97578 | 1.0574 | .02422 |
| 1.80 | 2.94217 | .46867 | 3.10747 | .49241 | 0.94681 | .97626 | 1.0562 | .02374 |
| 1.81 | 2.97340 | .47325 | 3.13705 | .49652 | .94783 | .97673 | 1.0550 | .02327 |
| 1.82 | 3.00492 | .47783 | 3.16694 | .50064 | .94884 | .97719 | 1.0539 | .02281 |
| 1.83 | 3.03674 | .48241 | 3.19715 | .50476 | .94983 | .97764 | 1.0528 | .02236 |
| 1.84 | 3.06886 | .48698 | 3.22768 | .50889 | .95080 | .97809 | 1.0518 | .02191 |
| 1.85 | 3.10129 | .49154 | 3.25853 | .51302 | 0.95175 | .97852 | 1.0507 | .02148 |
| 1.86 | 3.13403 | .49610 | 3.28970 | .51716 | .95268 | .97895 | 1.0497 | .02105 |
| 1.87 | 3.16709 | .50066 | 3.32121 | .52130 | .95359 | .97936 | 1.0487 | .02064 |
| 1.88 | 3.20046 | .50521 | 3.35305 | .52544 | .95449 | .97977 | 1.0477 | .02023 |
| 1.89 | 3.23415 | .50976 | 3.38522 | .52959 | .95537 | .98017 | 1.0467 | .01983 |
| 1.90 | 3.26816 | .51430 | 3.41773 | .53374 | 0.95624 | .98057 | 1.0458 | .01943 |
| 1.91 | 3.30250 | .51884 | 3.45058 | .53789 | .95709 | .98095 | 1.0448 | .01905 |
| 1.92 | 3.33718 | .52338 | 3.48378 | .54205 | .95792 | .98133 | 1.0439 | .01867 |
| 1.93 | 3.37218 | .52791 | 3.51733 | .54621 | .95873 | .98170 | 1.0430 | .01830 |
| 1.94 | 3.40752 | .53244 | 3.55123 | .55038 | .95953 | .98206 | 1.0422 | .01794 |
| 1.95 | 3.44321 | .53696 | 3.58548 | .55455 | 0.96032 | .98242 | 1.0413 | .01758 |
| 1.96 | 3.47923 | .54148 | 3.62009 | .55872 | .96109 | .98276 | 1.0406 | .01724 |
| 1.97 | 3.51561 | .54600 | 3.65507 | .56290 | .96185 | .98311 | 1.0397 | .01689 |
| 1.98 | 3.55234 | .55051 | 3.69041 | .56707 | .96259 | .98344 | 1.0389 | .01656 |
| 1.99 | 3.58942 | .55502 | 3.72611 | .57126 | .96331 | .98377 | 1.0381 | .01623 |

HYPERBOLIC FUNCTIONS (Continued)

The logarithms given below show the mantissa only. The proper characteristic must be added.

| x | Sinh x | | Cosh x | | Tanh x | | Coth x | |
|------|----------|-------------------|----------|-------------------|----------|-------------------|----------|-------------------|
| | Value | log ₁₀ | Value | log ₁₀ | Value | log ₁₀ | Value | log ₁₀ |
| 2.00 | 3.62686 | .55953 | 3.76220 | .57544 | 0.96403 | .98409 | 1.0373 | .01591 |
| 2.01 | 3.66466 | .56403 | 3.79865 | .57963 | .96473 | .98440 | 1.0366 | .01560 |
| 2.02 | 3.70283 | .56853 | 3.83549 | .58382 | .96541 | .98471 | 1.0358 | .01529 |
| 2.03 | 3.74138 | .57303 | 3.87271 | .58802 | .96609 | .98502 | 1.0351 | .01498 |
| 2.04 | 3.78029 | .57753 | 3.91032 | .59221 | .96675 | .98531 | 1.0344 | .01469 |
| 2.05 | 3.81958 | .58202 | 3.94832 | .59641 | 0.96740 | .98560 | 1.0337 | .01440 |
| 2.06 | 3.85926 | .58650 | 3.98671 | .60061 | .96803 | .98589 | 1.0330 | .01411 |
| 2.07 | 3.89932 | .59099 | 4.02550 | .60482 | .96865 | .98617 | 1.0324 | .01383 |
| 2.08 | 3.93977 | .59547 | 4.06470 | .60903 | .96926 | .98644 | 1.0317 | .01356 |
| 2.09 | 3.98061 | .59995 | 4.10430 | .61324 | .96986 | .98671 | 1.0311 | .01329 |
| 2.10 | 4.02186 | .60443 | 4.14431 | .61745 | 0.97045 | .98697 | 1.0304 | .01303 |
| 2.11 | 4.06350 | .60890 | 4.18474 | .62167 | .97103 | .98723 | 1.0298 | .01277 |
| 2.12 | 4.10555 | .61337 | 4.22558 | .62589 | .97159 | .98748 | 1.0292 | .01252 |
| 2.13 | 4.14801 | .61784 | 4.26685 | .63011 | .97215 | .98773 | 1.0286 | .01227 |
| 2.14 | 4.19089 | .62231 | 4.30855 | .63433 | .97269 | .98798 | 1.0281 | .01202 |
| 2.15 | 4.23419 | .62677 | 4.35067 | .63856 | 0.97323 | .98821 | 1.0275 | .01179 |
| 2.16 | 4.27791 | .63123 | 4.39323 | .64278 | .97375 | .98845 | 1.0270 | .01155 |
| 2.17 | 4.32205 | .63569 | 4.43623 | .64701 | .97426 | .98868 | 1.0264 | .01132 |
| 2.18 | 4.36663 | .64015 | 4.47967 | .65125 | .97477 | .98890 | 1.0259 | .01110 |
| 2.19 | 4.41165 | .64460 | 4.52356 | .65548 | .97526 | .98912 | 1.0254 | .01088 |
| 2.20 | 4.45711 | .64905 | 4.56791 | .65972 | 0.97574 | .98934 | 1.0249 | .01066 |
| 2.21 | 4.50301 | .65350 | 4.61271 | .66396 | .97622 | .98955 | 1.0244 | .01045 |
| 2.22 | 4.54936 | .65795 | 4.65797 | .66820 | .97668 | .98975 | 1.0239 | .01025 |
| 2.23 | 4.59617 | .66240 | 4.70370 | .67244 | .97714 | .98996 | 1.0234 | .01004 |
| 2.24 | 4.64344 | .66684 | 4.74989 | .67668 | .97759 | .99016 | 1.0229 | .00984 |
| 2.25 | 4.69117 | .67128 | 4.79657 | .68093 | 0.97803 | .99035 | 1.0225 | .00965 |
| 2.26 | 4.73937 | .67572 | 4.84372 | .68518 | .97846 | .99054 | 1.0220 | .00946 |
| 2.27 | 4.78804 | .68016 | 4.89136 | .68943 | .97888 | .99073 | 1.0216 | .00927 |
| 2.28 | 4.83720 | .68459 | 4.93948 | .69368 | .97929 | .99091 | 1.0211 | .00909 |
| 2.29 | 4.88684 | .68903 | 4.98810 | .69794 | .97970 | .99109 | 1.0207 | .00891 |
| 2.30 | 4.93696 | .69346 | 5.03722 | .70219 | 0.98010 | .99127 | 1.0203 | .00873 |
| 2.31 | 4.98758 | .69789 | 5.08684 | .70645 | .98049 | .99144 | 1.0199 | .00856 |
| 2.32 | 5.03870 | .70232 | 5.13697 | .71071 | .98087 | .99161 | 1.0195 | .00839 |
| 2.33 | 5.09032 | .70675 | 5.18762 | .71497 | .98124 | .99178 | 1.0191 | .00822 |
| 2.34 | 5.14245 | .71117 | 5.23878 | .71923 | .98161 | .99194 | 1.0187 | .00806 |
| 2.35 | 5.19510 | .71559 | 5.29047 | .72349 | 0.98197 | .99210 | 1.0184 | .00790 |
| 2.36 | 5.24827 | .72002 | 5.34269 | .72776 | .98233 | .99226 | 1.0180 | .00774 |
| 2.37 | 5.30196 | .72444 | 5.39544 | .73203 | .98267 | .99241 | 1.0176 | .00759 |
| 2.38 | 5.35618 | .72885 | 5.44873 | .73630 | .98301 | .99256 | 1.0173 | .00744 |
| 2.39 | 5.41093 | .73327 | 5.50256 | .74056 | .98335 | .99271 | 1.0169 | .00729 |
| 2.40 | 5.46623 | .73769 | 5.55695 | .74484 | 0.98367 | .99285 | 1.0166 | .00715 |
| 2.41 | 5.52207 | .74210 | 5.61189 | .74911 | .98400 | .99299 | 1.0163 | .00701 |
| 2.42 | 5.57847 | .74652 | 5.66739 | .75338 | .98431 | .99313 | 1.0159 | .00687 |
| 2.43 | 5.63542 | .75093 | 5.72346 | .75766 | .98462 | .99327 | 1.0156 | .00673 |
| 2.44 | 5.69294 | .75534 | 5.78010 | .76194 | .98492 | .99340 | 1.0153 | .00660 |
| 2.45 | 5.75103 | .75975 | 5.83732 | .76621 | 0.98522 | .99353 | 1.0150 | .00647 |
| 2.46 | 5.80969 | .76415 | 5.89512 | .77049 | .98551 | .99366 | 1.0147 | .00634 |
| 2.47 | 5.86893 | .76856 | 5.95352 | .77477 | .98579 | .99379 | 1.0144 | .00621 |
| 2.48 | 5.92876 | .77296 | 6.01250 | .77906 | .98607 | .99391 | 1.0141 | .00609 |
| 2.49 | 5.98918 | .77737 | 6.07209 | .78334 | .98635 | .99403 | 1.0138 | .00597 |

HYPERBOLIC FUNCTIONS (Continued)

The logarithms given below show the mantissa only. The proper characteristic must be added.

| x | Sinh x | | Cosh x | | Tanh x | | Coth x | |
|------|----------|-------------|----------|-------------|----------|-------------|----------|-------------|
| | Value | \log_{10} | Value | \log_{10} | Value | \log_{10} | Value | \log_{10} |
| 2.50 | 6.05020 | .78177 | 6.13229 | .78762 | 0.98661 | .99415 | 1.0136 | .00585 |
| 2.51 | 6.11183 | .78617 | 6.19310 | .79191 | .98688 | .99426 | 1.0133 | .00574 |
| 2.52 | 6.17407 | .79057 | 6.25453 | .79619 | .98714 | .99438 | 1.0130 | .00562 |
| 2.53 | 6.23692 | .79497 | 6.31658 | .80048 | .98739 | .99449 | 1.0128 | .00551 |
| 2.54 | 6.30040 | .79937 | 6.37927 | .80477 | .98764 | .99460 | 1.0125 | .00540 |
| 2.55 | 6.36451 | .80377 | 6.44259 | .80906 | 0.98788 | .99470 | 1.0123 | .00530 |
| 2.56 | 6.42926 | .80816 | 6.50656 | .81335 | .98812 | .99481 | 1.0120 | .00519 |
| 2.57 | 6.49464 | .81256 | 6.57118 | .81764 | .98835 | .99491 | 1.0118 | .00509 |
| 2.58 | 6.56068 | .81695 | 6.63646 | .82194 | .98858 | .99501 | 1.0115 | .00499 |
| 2.59 | 6.62738 | .82134 | 6.70240 | .82623 | .98881 | .99511 | 1.0113 | .00489 |
| 2.60 | 6.69473 | .82573 | 6.76901 | .83052 | 0.98903 | .99521 | 1.0111 | .00479 |
| 2.61 | 6.76276 | .83012 | 6.83629 | .83482 | .98924 | .99530 | 1.0109 | .00470 |
| 2.62 | 6.83146 | .83451 | 6.90426 | .83912 | .98946 | .99540 | 1.0107 | .00460 |
| 2.63 | 6.90085 | .83890 | 6.97292 | .84341 | .98966 | .99549 | 1.0104 | .00451 |
| 2.64 | 6.97092 | .84329 | 7.04228 | .84771 | .98987 | .99558 | 1.0102 | .00442 |
| 2.65 | 7.04169 | .84768 | 7.11234 | .85201 | 0.99007 | .99566 | 1.0100 | .00434 |
| 2.66 | 7.11317 | .85206 | 7.18312 | .85631 | .99026 | .99575 | 1.0098 | .00425 |
| 2.67 | 7.18536 | .85645 | 7.25461 | .86061 | .99045 | .99583 | 1.0096 | .00417 |
| 2.68 | 7.25827 | .86083 | 7.32683 | .86492 | .99064 | .99592 | 1.0094 | .00408 |
| 2.69 | 7.33190 | .86522 | 7.39978 | .86922 | .99083 | .99600 | 1.0093 | .00400 |
| 2.70 | 7.40626 | .86960 | 7.47347 | .87352 | 0.99101 | .99608 | 1.0091 | .00392 |
| 2.71 | 7.48137 | .87398 | 7.54791 | .87783 | .99118 | .99615 | 1.0089 | .00385 |
| 2.72 | 7.55722 | .87836 | 7.62310 | .88213 | .99136 | .99623 | 1.0087 | .00377 |
| 2.73 | 7.63383 | .88274 | 7.69905 | .88644 | .99153 | .99631 | 1.0085 | .00369 |
| 2.74 | 7.71121 | .88712 | 7.77578 | .89074 | .99170 | .99638 | 1.0084 | .00362 |
| 2.75 | 7.78935 | .89150 | 7.85328 | .89505 | 0.99186 | .99645 | 1.0082 | .00355 |
| 2.76 | 7.86828 | .89588 | 7.93157 | .89936 | .99202 | .99652 | 1.0080 | .00348 |
| 2.77 | 7.94799 | .90026 | 8.01065 | .90367 | .99218 | .99659 | 1.0079 | .00341 |
| 2.78 | 8.02849 | .90463 | 8.09053 | .90798 | .99233 | .99666 | 1.0077 | .00334 |
| 2.79 | 8.10980 | .90901 | 8.17122 | .91229 | .99248 | .99672 | 1.0076 | .00328 |
| 2.80 | 8.19192 | .91339 | 8.25273 | .91660 | 0.99263 | .99679 | 1.0074 | .00321 |
| 2.81 | 8.27486 | .91776 | 8.33506 | .92091 | .99278 | .99685 | 1.0073 | .00315 |
| 2.82 | 8.35862 | .92213 | 8.41823 | .92522 | .99292 | .99691 | 1.0071 | .00309 |
| 2.83 | 8.44322 | .92651 | 8.50224 | .92953 | .99306 | .99698 | 1.0070 | .00302 |
| 2.84 | 8.52867 | .93088 | 8.58710 | .93385 | .99320 | .99704 | 1.0069 | .00296 |
| 2.85 | 8.61497 | .93525 | 8.67281 | .93816 | 0.99333 | .99709 | 1.0067 | .00291 |
| 2.86 | 8.70213 | .93963 | 8.75940 | .94247 | .99346 | .99715 | 1.0066 | .00285 |
| 2.87 | 8.79016 | .94400 | 8.84686 | .94679 | .99359 | .99721 | 1.0065 | .00279 |
| 2.88 | 8.87907 | .94837 | 8.93520 | .95110 | .99372 | .99726 | 1.0063 | .00274 |
| 2.89 | 8.96887 | .95274 | 9.02444 | .95542 | .99384 | .99732 | 1.0062 | .00268 |
| 2.90 | 9.05956 | .95711 | 9.11458 | .95974 | 0.99396 | .99737 | 1.0061 | .00263 |
| 2.91 | 9.15116 | .96148 | 9.20564 | .96405 | .99408 | .99742 | 1.0060 | .00258 |
| 2.92 | 9.24368 | .96584 | 9.29761 | .96837 | .99420 | .99747 | 1.0058 | .00253 |
| 2.93 | 9.33712 | .97021 | 9.39051 | .97269 | .99431 | .99752 | 1.0057 | .00248 |
| 2.94 | 9.43149 | .97458 | 9.48436 | .97701 | .99443 | .99757 | 1.0056 | .00243 |
| 2.95 | 9.52681 | .97895 | 9.57915 | .98133 | 0.99454 | .99762 | 1.0055 | .00238 |
| 2.96 | 9.62308 | .98331 | 9.67490 | .98565 | .99464 | .99767 | 1.0054 | .00233 |
| 2.97 | 9.72031 | .98768 | 9.77161 | .98997 | .99475 | .99771 | 1.0053 | .00229 |
| 2.98 | 9.81851 | .99205 | 9.86930 | .99429 | .99485 | .99776 | 1.0052 | .00224 |
| 2.99 | 9.91770 | .99641 | 9.96798 | .99861 | .99496 | .99780 | 1.0051 | .00220 |
| 3.00 | 10.01787 | .00078 | 10.06766 | .00293 | 0.99505 | .99785 | 1.0050 | .00215 |

HYPERBOLIC FUNCTIONS (Continued)

The logarithms given below show the mantissa only. The proper characteristic must be added.

| x | Sinh x | | Cosh x | | Tanh x | | Coth x | |
|-----|----------|-------------------|----------|-------------------|----------|-------------------|----------|-------------------|
| | Value | log ₁₀ | Value | log ₁₀ | Value | log ₁₀ | Value | log ₁₀ |
| 3.0 | 10.0179 | .00078 | 10.0677 | .00293 | 0.99505 | .99785 | 1.0050 | .00215 |
| 3.1 | 11.0765 | .04440 | 11.1215 | .04616 | .99595 | .99824 | 1.0041 | .00176 |
| 3.2 | 12.2459 | .08799 | 12.2866 | .08943 | .99668 | .99856 | 1.0033 | .00144 |
| 3.3 | 13.5379 | .13155 | 13.5748 | .13273 | .99728 | .99882 | 1.0027 | .00118 |
| 3.4 | 14.9654 | .17509 | 14.9987 | .17605 | .99777 | .99903 | 1.0022 | .00097 |
| 3.5 | 16.5426 | .21860 | 16.5728 | .21940 | 0.99818 | .99921 | 1.0018 | .00079 |
| 3.6 | 18.2855 | .26211 | 18.3128 | .26275 | .99851 | .99935 | 1.0015 | .00065 |
| 3.7 | 20.2113 | .30559 | 20.2360 | .30612 | .99878 | .99947 | 1.0012 | .00053 |
| 3.8 | 22.3394 | .34907 | 22.3618 | .34951 | .99900 | .99957 | 1.0010 | .00043 |
| 3.9 | 24.6911 | .39254 | 24.7113 | .39290 | .99918 | .99964 | 1.0008 | .00036 |
| 4.0 | 27.2899 | .43600 | 27.3082 | .43629 | 0.99933 | .99971 | 1.0007 | .00029 |
| 4.1 | 30.1619 | .47946 | 30.1784 | .47970 | .99945 | .99976 | 1.0005 | .00024 |
| 4.2 | 33.3357 | .52291 | 33.3507 | .52310 | .99955 | .99980 | 1.0004 | .00020 |
| 4.3 | 36.8431 | .56636 | 36.8567 | .56652 | .99963 | .99984 | 1.0004 | .00016 |
| 4.4 | 40.7193 | .60980 | 40.7316 | .60993 | .99970 | .99987 | 1.0003 | .00013 |
| 4.5 | 45.0030 | .65324 | 45.0141 | .65335 | 0.99975 | .99989 | 1.0002 | .00011 |
| 4.6 | 49.7371 | .69668 | 49.7472 | .69677 | .99980 | .99991 | 1.0002 | .00009 |
| 4.7 | 54.9690 | .74012 | 54.9781 | .74019 | .99983 | .99993 | 1.0002 | .00007 |
| 4.8 | 60.7511 | .78355 | 60.7593 | .78361 | .99986 | .99994 | 1.0001 | .00006 |
| 4.9 | 67.1412 | .82699 | 67.1486 | .82704 | .99989 | .99995 | 1.0001 | .00005 |
| 5.0 | 74.2032 | .87042 | 74.2099 | .87046 | 0.99991 | .99996 | 1.0001 | .00004 |

FACTORIALS, EXACT VALUES AND RECIPROCAL

| n | $n!$ | n | $n!$ | n | $1/n!$ | n | $1/n!$ |
|-----|---------|-----|---------------------|-----|-------------------------|-----|--------------------------|
| 1 | 1 | 11 | 39916800 | 1 | 1. | 11 | .25052 $\times 10^{-7}$ |
| 2 | 2 | 12 | 479001600 | 2 | 0.5 | 12 | .20877 $\times 10^{-8}$ |
| 3 | 6 | 13 | 6227020800 | 3 | .16667 | 13 | .16059 $\times 10^{-9}$ |
| 4 | 24 | 14 | 87178291200 | 4 | .41667 $\times 10^{-1}$ | 14 | .11471 $\times 10^{-10}$ |
| 5 | 120 | 15 | 1307674368000 | 5 | .83333 $\times 10^{-2}$ | 15 | .76472 $\times 10^{-12}$ |
| 6 | 720 | 16 | 20922789888000 | 6 | .13889 $\times 10^{-2}$ | 16 | .47795 $\times 10^{-13}$ |
| 7 | 5040 | 17 | 355687428096000 | 7 | .19841 $\times 10^{-3}$ | 17 | .28115 $\times 10^{-14}$ |
| 8 | 40320 | 18 | 6402373705728000 | 8 | .24802 $\times 10^{-4}$ | 18 | .15619 $\times 10^{-15}$ |
| 9 | 362880 | 19 | 121645100408832000 | 9 | .27557 $\times 10^{-5}$ | 19 | .82206 $\times 10^{-17}$ |
| 10 | 3628800 | 20 | 2432902008176640000 | 10 | .27557 $\times 10^{-6}$ | 20 | .41103 $\times 10^{-18}$ |

DEGREES—RADIAN

1 radian = 57° 17' 44".80625

| | log |
|--|------------------|
| 1 radian = 57.29577 95131 degrees | 1.75812 26324 |
| 1 radian = 3437.74677 07849 minutes | 3.53627 38828 |
| 1 radian = 206264.80625 seconds | 5.31442 51332 |
| 1 degree = 0.01745 32925 19943 radians | 8.24187 73676-10 |
| 1 minute = 0.00029 08882 08666 radians | 6.46372 61172-10 |
| 1 second = 0.00000 48481 36811 radians | 4.68557 48668-10 |

DEGREES—RADIANS

The table gives in radians the angle which is expressed in degrees and minutes at the side and top. Angles expressed to the nearest minute and second can readily be converted to radians by adding to the equivalent of the whole number of degrees the equivalents of the minutes and seconds found on the third page of this table.

| ° | 00' | 10 | 20 | 30 | 40 | 50 |
|----|---------|---------|---------|---------|---------|---------|
| 0 | 0.00000 | 0.00291 | 0.00582 | 0.00873 | 0.01164 | 0.01454 |
| 1 | 0.01745 | 0.02036 | 0.02327 | 0.02618 | 0.02909 | 0.03200 |
| 2 | 0.03491 | 0.03782 | 0.04072 | 0.04363 | 0.04654 | 0.04945 |
| 3 | 0.05236 | 0.05527 | 0.05818 | 0.06109 | 0.06400 | 0.06690 |
| 4 | 0.06981 | 0.07272 | 0.07563 | 0.07854 | 0.08145 | 0.08436 |
| 5 | 0.08727 | 0.09018 | 0.09308 | 0.09599 | 0.09890 | 0.10181 |
| 6 | 0.10472 | 0.10763 | 0.11054 | 0.11345 | 0.11636 | 0.11926 |
| 7 | 0.12217 | 0.12508 | 0.12799 | 0.13090 | 0.13381 | 0.13672 |
| 8 | 0.13963 | 0.14254 | 0.14544 | 0.14835 | 0.15126 | 0.15417 |
| 9 | 0.15708 | 0.15999 | 0.16290 | 0.16581 | 0.16872 | 0.17162 |
| 10 | 0.17453 | 0.17744 | 0.18035 | 0.18326 | 0.18617 | 0.18908 |
| 11 | 0.19199 | 0.19490 | 0.19780 | 0.20071 | 0.20362 | 0.20653 |
| 12 | 0.20944 | 0.21235 | 0.21526 | 0.21817 | 0.22108 | 0.22398 |
| 13 | 0.22689 | 0.22980 | 0.23271 | 0.23562 | 0.23853 | 0.24144 |
| 14 | 0.24435 | 0.24725 | 0.25016 | 0.25307 | 0.25598 | 0.25889 |
| 15 | 0.26180 | 0.26471 | 0.26762 | 0.27053 | 0.27343 | 0.27634 |
| 16 | 0.27925 | 0.28216 | 0.28507 | 0.28798 | 0.29089 | 0.29380 |
| 17 | 0.29671 | 0.29961 | 0.30252 | 0.30543 | 0.30834 | 0.31125 |
| 18 | 0.31416 | 0.31707 | 0.31998 | 0.32289 | 0.32579 | 0.32870 |
| 19 | 0.33161 | 0.33452 | 0.33743 | 0.34034 | 0.34325 | 0.34616 |
| 20 | 0.34907 | 0.35197 | 0.35488 | 0.35779 | 0.36070 | 0.36361 |
| 21 | 0.36652 | 0.36943 | 0.37234 | 0.37525 | 0.37815 | 0.38106 |
| 22 | 0.38397 | 0.38688 | 0.38979 | 0.39270 | 0.39561 | 0.39852 |
| 23 | 0.40143 | 0.40433 | 0.40724 | 0.41015 | 0.41306 | 0.41597 |
| 24 | 0.41888 | 0.42179 | 0.42470 | 0.42761 | 0.43051 | 0.43342 |
| 25 | 0.43633 | 0.43924 | 0.44215 | 0.44506 | 0.44797 | 0.45088 |
| 26 | 0.45379 | 0.45669 | 0.45960 | 0.46251 | 0.46542 | 0.46833 |
| 27 | 0.47124 | 0.47415 | 0.47706 | 0.47997 | 0.48287 | 0.48578 |
| 28 | 0.48869 | 0.49160 | 0.49451 | 0.49742 | 0.50033 | 0.50324 |
| 29 | 0.50615 | 0.50905 | 0.51196 | 0.51487 | 0.51778 | 0.52069 |
| 30 | 0.52360 | 0.52651 | 0.52942 | 0.53233 | 0.53523 | 0.53814 |
| 31 | 0.54105 | 0.54396 | 0.54687 | 0.54978 | 0.55269 | 0.55560 |
| 32 | 0.55851 | 0.56141 | 0.56432 | 0.56723 | 0.57014 | 0.57305 |
| 33 | 0.57596 | 0.57887 | 0.58178 | 0.58469 | 0.58759 | 0.59050 |
| 34 | 0.59341 | 0.59632 | 0.59923 | 0.60214 | 0.60505 | 0.60796 |
| 35 | 0.61087 | 0.61377 | 0.61668 | 0.61959 | 0.62250 | 0.62541 |
| 36 | 0.62832 | 0.63123 | 0.63414 | 0.63705 | 0.63995 | 0.64286 |
| 37 | 0.64577 | 0.64868 | 0.65159 | 0.65450 | 0.65741 | 0.66032 |
| 38 | 0.66323 | 0.66613 | 0.66904 | 0.67195 | 0.67486 | 0.67777 |
| 39 | 0.68068 | 0.68359 | 0.68650 | 0.68941 | 0.69231 | 0.69522 |
| 40 | 0.69813 | 0.70104 | 0.70395 | 0.70686 | 0.70977 | 0.71268 |
| 41 | 0.71558 | 0.71849 | 0.72140 | 0.72431 | 0.72722 | 0.73013 |
| 42 | 0.73304 | 0.73595 | 0.73886 | 0.74176 | 0.74467 | 0.74758 |
| 43 | 0.75049 | 0.75340 | 0.75631 | 0.75922 | 0.76213 | 0.76504 |
| 44 | 0.76794 | 0.77085 | 0.77376 | 0.77667 | 0.77958 | 0.78249 |
| 45 | 0.78540 | 0.78831 | 0.79122 | 0.79412 | 0.79703 | 0.79994 |
| 46 | 0.80285 | 0.80576 | 0.80867 | 0.81158 | 0.81449 | 0.81740 |
| 47 | 0.82030 | 0.82321 | 0.82612 | 0.82903 | 0.83194 | 0.83485 |
| 48 | 0.83776 | 0.84067 | 0.84358 | 0.84648 | 0.84939 | 0.85230 |
| 49 | 0.85521 | 0.85812 | 0.86103 | 0.86394 | 0.86685 | 0.86976 |
| 50 | 0.87266 | 0.87557 | 0.87848 | 0.88139 | 0.88430 | 0.88721 |

DEGREES—RADIANS (Continued)

| ° | 00' | 10 | 20 | 30 | 40 | 50 |
|-----|---------|---------|---------|---------|---------|---------|
| 50 | 0.87266 | 0.87557 | 0.87848 | 0.88139 | 0.88430 | 0.88721 |
| 51 | 0.89012 | 0.89303 | 0.89594 | 0.89884 | 0.90175 | 0.90466 |
| 52 | 0.90757 | 0.91048 | 0.91339 | 0.91630 | 0.91921 | 0.92212 |
| 53 | 0.92502 | 0.92793 | 0.93084 | 0.93375 | 0.93666 | 0.93957 |
| 54 | 0.94248 | 0.94539 | 0.94830 | 0.95120 | 0.95411 | 0.95702 |
| 55 | 0.95993 | 0.96284 | 0.96575 | 0.96866 | 0.97157 | 0.97448 |
| 56 | 0.97738 | 0.98029 | 0.98320 | 0.98611 | 0.98902 | 0.99193 |
| 57 | 0.99484 | 0.99775 | 1.00066 | 1.00356 | 1.00647 | 1.00938 |
| 58 | 1.01229 | 1.01520 | 1.01811 | 1.02102 | 1.02393 | 1.02684 |
| 59 | 1.02974 | 1.03265 | 1.03556 | 1.03847 | 1.04138 | 1.04429 |
| 60 | 1.04720 | 1.05011 | 1.05302 | 1.05592 | 1.05883 | 1.06174 |
| 61 | 1.06465 | 1.06756 | 1.07047 | 1.07338 | 1.07629 | 1.07920 |
| 62 | 1.08210 | 1.08501 | 1.08792 | 1.09083 | 1.09374 | 1.09665 |
| 63 | 1.09956 | 1.10247 | 1.10538 | 1.10828 | 1.11119 | 1.11410 |
| 64 | 1.11701 | 1.11992 | 1.12283 | 1.12574 | 1.12865 | 1.13156 |
| 65 | 1.13446 | 1.13737 | 1.14028 | 1.14319 | 1.14610 | 1.14901 |
| 66 | 1.15192 | 1.15483 | 1.15774 | 1.16064 | 1.16355 | 1.16646 |
| 67 | 1.16937 | 1.17228 | 1.17519 | 1.17810 | 1.18101 | 1.18392 |
| 68 | 1.18682 | 1.18973 | 1.19264 | 1.19555 | 1.19846 | 1.20137 |
| 69 | 1.20428 | 1.20719 | 1.21009 | 1.21300 | 1.21591 | 1.21882 |
| 70 | 1.22173 | 1.22464 | 1.22755 | 1.23046 | 1.23337 | 1.23627 |
| 71 | 1.23918 | 1.24209 | 1.24500 | 1.24791 | 1.25082 | 1.25373 |
| 72 | 1.25664 | 1.25955 | 1.26245 | 1.26536 | 1.26827 | 1.27118 |
| 73 | 1.27409 | 1.27700 | 1.27991 | 1.28282 | 1.28573 | 1.28863 |
| 74 | 1.29154 | 1.29445 | 1.29736 | 1.30027 | 1.30318 | 1.30609 |
| 75 | 1.30900 | 1.31191 | 1.31481 | 1.31772 | 1.32063 | 1.32354 |
| 76 | 1.32645 | 1.32936 | 1.33227 | 1.33518 | 1.33809 | 1.34099 |
| 77 | 1.34390 | 1.34681 | 1.34972 | 1.35263 | 1.35554 | 1.35845 |
| 78 | 1.36136 | 1.36427 | 1.36717 | 1.37008 | 1.37299 | 1.37590 |
| 79 | 1.37881 | 1.38172 | 1.38463 | 1.38754 | 1.39045 | 1.39335 |
| 80 | 1.39626 | 1.39917 | 1.40208 | 1.40499 | 1.40790 | 1.41081 |
| 81 | 1.41372 | 1.41663 | 1.41953 | 1.42244 | 1.42535 | 1.42826 |
| 82 | 1.43117 | 1.43408 | 1.43699 | 1.43990 | 1.44281 | 1.44571 |
| 83 | 1.44862 | 1.45153 | 1.45444 | 1.45735 | 1.46026 | 1.46317 |
| 84 | 1.46608 | 1.46899 | 1.47189 | 1.47480 | 1.47771 | 1.48062 |
| 85 | 1.48353 | 1.48644 | 1.48935 | 1.49226 | 1.49517 | 1.49807 |
| 86 | 1.50098 | 1.50389 | 1.50680 | 1.50971 | 1.51262 | 1.51553 |
| 87 | 1.51844 | 1.52135 | 1.52425 | 1.52716 | 1.53007 | 1.53298 |
| 88 | 1.53589 | 1.53880 | 1.54171 | 1.54462 | 1.54753 | 1.55043 |
| 89 | 1.55334 | 1.55625 | 1.55916 | 1.56207 | 1.56498 | 1.56789 |
| 90 | 1.57080 | 1.57371 | 1.57661 | 1.57952 | 1.58243 | 1.58534 |
| 91 | 1.58825 | 1.59116 | 1.59407 | 1.59698 | 1.59989 | 1.60279 |
| 92 | 1.60570 | 1.60861 | 1.61152 | 1.61443 | 1.61734 | 1.62025 |
| 93 | 1.62316 | 1.62607 | 1.62897 | 1.63188 | 1.63479 | 1.63770 |
| 94 | 1.64061 | 1.64352 | 1.64643 | 1.64934 | 1.65225 | 1.65515 |
| 95 | 1.65806 | 1.66097 | 1.66388 | 1.66679 | 1.66970 | 1.67261 |
| 96 | 1.67552 | 1.67842 | 1.68133 | 1.68424 | 1.68715 | 1.69006 |
| 97 | 1.69297 | 1.69588 | 1.69879 | 1.70170 | 1.70460 | 1.70751 |
| 98 | 1.71042 | 1.71333 | 1.71624 | 1.71915 | 1.72206 | 1.72497 |
| 99 | 1.72788 | 1.73078 | 1.73369 | 1.73660 | 1.73951 | 1.74242 |
| 100 | 1.74533 | 1.74824 | 1.75115 | 1.75406 | 1.75696 | 1.75987 |
| 101 | 1.76278 | 1.76569 | 1.76860 | 1.77151 | 1.77442 | 1.77733 |
| 102 | 1.78024 | 1.78314 | 1.78605 | 1.78896 | 1.79187 | 1.79478 |
| 103 | 1.79769 | 1.80060 | 1.80351 | 1.80642 | 1.80932 | 1.81223 |
| 104 | 1.81514 | 1.81805 | 1.82096 | 1.82387 | 1.82678 | 1.82969 |
| 105 | 1.83260 | 1.83550 | 1.83841 | 1.84132 | 1.84423 | 1.84714 |
| 106 | 1.85004 | 1.85296 | 1.85587 | 1.85878 | 1.86168 | 1.86459 |
| 107 | 1.86750 | 1.87041 | 1.87332 | 1.87623 | 1.87914 | 1.88205 |
| 108 | 1.88496 | 1.88786 | 1.89077 | 1.89368 | 1.89659 | 1.89950 |
| 109 | 1.90241 | 1.90532 | 1.90823 | 1.91114 | 1.91404 | 1.91695 |
| 110 | 1.91986 | 1.92277 | 1.92568 | 1.92859 | 1.93150 | 1.93441 |

DEGREES—RADIANS (Concluded)

| Deg. | Radians | Deg. | Radians | Min. | Radians | Sec. | Radians |
|------|---------|------|---------|------|---------|------|---------|
| 90 | 1.57080 | 150 | 2.61799 | 0 | 0.00000 | 0 | 0.00000 |
| 91 | 1.58825 | 151 | 2.63545 | 1 | 0.00029 | 1 | 0.00000 |
| 92 | 1.60570 | 152 | 2.65290 | 2 | 0.00058 | 2 | 0.00001 |
| 93 | 1.62316 | 153 | 2.67035 | 3 | 0.00087 | 3 | 0.00001 |
| 94 | 1.64061 | 154 | 2.68781 | 4 | 0.00116 | 4 | 0.00002 |
| 95 | 1.65806 | 155 | 2.70526 | 5 | 0.00145 | 5 | 0.00002 |
| 96 | 1.67552 | 156 | 2.72271 | 6 | 0.00175 | 6 | 0.00003 |
| 97 | 1.69297 | 157 | 2.74017 | 7 | 0.00204 | 7 | 0.00003 |
| 98 | 1.71042 | 158 | 2.75762 | 8 | 0.00233 | 8 | 0.00004 |
| 99 | 1.72788 | 159 | 2.77507 | 9 | 0.00262 | 9 | 0.00004 |
| 100 | 1.74533 | 160 | 2.79253 | 10 | 0.00291 | 10 | 0.00005 |
| 101 | 1.76278 | 161 | 2.80998 | 11 | 0.00320 | 11 | 0.00005 |
| 102 | 1.78024 | 162 | 2.82743 | 12 | 0.00349 | 12 | 0.00006 |
| 103 | 1.79769 | 163 | 2.84489 | 13 | 0.00378 | 13 | 0.00006 |
| 104 | 1.81514 | 164 | 2.86234 | 14 | 0.00407 | 14 | 0.00007 |
| 105 | 1.83260 | 165 | 2.87979 | 15 | 0.00436 | 15 | 0.00007 |
| 106 | 1.85005 | 166 | 2.89725 | 16 | 0.00465 | 16 | 0.00008 |
| 107 | 1.86750 | 167 | 2.91470 | 17 | 0.00495 | 17 | 0.00008 |
| 108 | 1.88496 | 168 | 2.93215 | 18 | 0.00524 | 18 | 0.00009 |
| 109 | 1.90241 | 169 | 2.94961 | 19 | 0.00553 | 19 | 0.00009 |
| 110 | 1.91986 | 170 | 2.96706 | 20 | 0.00582 | 20 | 0.00010 |
| 111 | 1.93732 | 171 | 2.98451 | 21 | 0.00611 | 21 | 0.00010 |
| 112 | 1.95477 | 172 | 3.00197 | 22 | 0.00640 | 22 | 0.00011 |
| 113 | 1.97222 | 173 | 3.01942 | 23 | 0.00669 | 23 | 0.00011 |
| 114 | 1.98968 | 174 | 3.03687 | 24 | 0.00698 | 24 | 0.00012 |
| 115 | 2.00713 | 175 | 3.05433 | 25 | 0.00727 | 25 | 0.00012 |
| 116 | 2.02458 | 176 | 3.07178 | 26 | 0.00756 | 26 | 0.00013 |
| 117 | 2.04204 | 177 | 3.08923 | 27 | 0.00785 | 27 | 0.00013 |
| 118 | 2.05949 | 178 | 3.10669 | 28 | 0.00814 | 28 | 0.00014 |
| 119 | 2.07694 | 179 | 3.12414 | 29 | 0.00844 | 29 | 0.00014 |
| 120 | 2.09440 | 180 | 3.14159 | 30 | 0.00873 | 30 | 0.00015 |
| 121 | 2.11185 | 190 | 3.31613 | 31 | 0.00902 | 31 | 0.00015 |
| 122 | 2.12930 | 200 | 3.49066 | 32 | 0.00931 | 32 | 0.00016 |
| 123 | 2.14676 | 210 | 3.66519 | 33 | 0.00960 | 33 | 0.00016 |
| 124 | 2.16421 | 220 | 3.83972 | 34 | 0.00989 | 34 | 0.00016 |
| 125 | 2.18166 | 230 | 4.01426 | 35 | 0.01018 | 35 | 0.00017 |
| 126 | 2.19911 | 240 | 4.18879 | 36 | 0.01047 | 36 | 0.00017 |
| 127 | 2.21657 | 250 | 4.36332 | 37 | 0.01076 | 37 | 0.00018 |
| 128 | 2.23402 | 260 | 4.53786 | 38 | 0.01105 | 38 | 0.00018 |
| 129 | 2.25147 | 270 | 4.71239 | 39 | 0.01134 | 39 | 0.00019 |
| 130 | 2.26893 | 280 | 4.88692 | 40 | 0.01164 | 40 | 0.00019 |
| 131 | 2.28638 | 290 | 5.06145 | 41 | 0.01193 | 41 | 0.00020 |
| 132 | 2.30383 | 300 | 5.23599 | 42 | 0.01222 | 42 | 0.00020 |
| 133 | 2.32129 | 310 | 5.41052 | 43 | 0.01251 | 43 | 0.00021 |
| 134 | 2.33874 | 320 | 5.58505 | 44 | 0.01280 | 44 | 0.00021 |
| 135 | 2.35619 | 330 | 5.75959 | 45 | 0.01309 | 45 | 0.00022 |
| 136 | 2.37365 | 340 | 5.93412 | 46 | 0.01338 | 46 | 0.00022 |
| 137 | 2.39110 | 350 | 6.10865 | 47 | 0.01367 | 47 | 0.00023 |
| 138 | 2.40855 | 360 | 6.28319 | 48 | 0.01396 | 48 | 0.00023 |
| 139 | 2.42601 | 370 | 6.45772 | 49 | 0.01425 | 49 | 0.00024 |
| 140 | 2.44346 | 380 | 6.63225 | 50 | 0.01454 | 50 | 0.00024 |
| 141 | 2.46091 | 390 | 6.80678 | 51 | 0.01484 | 51 | 0.00025 |
| 142 | 2.47837 | 400 | 6.98132 | 52 | 0.01513 | 52 | 0.00025 |
| 143 | 2.49582 | 410 | 7.15585 | 53 | 0.01542 | 53 | 0.00026 |
| 144 | 2.51327 | 420 | 7.33038 | 54 | 0.01571 | 54 | 0.00026 |
| 145 | 2.53073 | 430 | 7.50492 | 55 | 0.01600 | 55 | 0.00027 |
| 146 | 2.54818 | 440 | 7.67945 | 56 | 0.01629 | 56 | 0.00027 |
| 147 | 2.56563 | 450 | 7.85398 | 57 | 0.01658 | 57 | 0.00028 |
| 148 | 2.58309 | 460 | 8.02851 | 58 | 0.01687 | 58 | 0.00028 |
| 149 | 2.60054 | 470 | 8.20305 | 59 | 0.01716 | 59 | 0.00029 |
| 150 | 2.61799 | 480 | 8.37758 | 60 | 0.01745 | 60 | 0.00029 |

DEGREES AND DECIMAL FRACTIONS TO RADIANS

The table below facilitates conversion of an angle expressed in degrees and decimal fractions into radians. To convert 25.78 into radians, find the equivalents, successively, of 20°, 5°, 0°.7, 0°.08 and add.

| Deg. | Radians | Deg. | Radians | Deg. | Radians | Deg. | Radians | Deg. | Radians |
|------|----------|------|----------|------|----------|------|----------|-------|----------|
| 10 | 0.174533 | 1 | 0.017453 | 0.1 | 0.001745 | 0.01 | 0.000175 | 0.001 | 0.000017 |
| 20 | 0.349066 | 2 | .034907 | .2 | .003491 | .02 | .000349 | .002 | .000035 |
| 30 | 0.523599 | 3 | .052360 | .3 | .005236 | .03 | .000524 | .003 | .000052 |
| 40 | 0.698132 | 4 | .069813 | .4 | .006981 | .04 | .000698 | .004 | .000070 |
| 50 | 0.872665 | 5 | .087266 | .5 | .008727 | .05 | .000873 | .005 | .000087 |
| 60 | 1.047198 | 6 | .104720 | .6 | .010472 | .06 | .001047 | .006 | .000105 |
| 70 | 1.221730 | 7 | .122173 | .7 | .012217 | .07 | .001222 | .007 | .000122 |
| 80 | 1.396263 | 8 | .139626 | .8 | .013963 | .08 | .001396 | .008 | .000140 |
| 90 | 1.570796 | 9 | .157080 | .9 | .015708 | .09 | .001571 | .009 | .000157 |

RADIANS—DEGREES

| Radians | Degrees | Radians | Degrees | Radians | Degrees | Radians | Degrees |
|---------|----------|---------|---------|---------|---------|---------|---------|
| 1 | 57.2958 | 0.1 | 5.7296 | 0.01 | 0.5730 | 0.001 | 0.0573 |
| 2 | 114.5916 | .2 | 11.4592 | .02 | 1.1459 | .002 | .1146 |
| 3 | 171.8873 | .3 | 17.1887 | .03 | 1.7189 | .003 | .1719 |
| 4 | 229.1831 | .4 | 22.9183 | .04 | 2.2918 | .004 | .2292 |
| 5 | 286.4789 | .5 | 28.6479 | .05 | 2.8648 | .005 | .2865 |
| 6 | 343.7747 | .6 | 34.3775 | .06 | 3.4377 | .006 | .3438 |
| 7 | 401.0705 | .7 | 40.1070 | .07 | 4.0107 | .007 | .4011 |
| 8 | 458.3662 | .8 | 45.8366 | .08 | 4.5837 | .008 | .4584 |
| 9 | 515.6620 | .9 | 51.5662 | .09 | 5.1566 | .009 | .5157 |
| 10 | 572.9578 | 1.0 | 57.2958 | .10 | 5.7296 | .010 | .5730 |

RADIANS—DEGREES Multiples and Fractions of π Radians

| Radians | Radians | Deg. | Radians | Radians | Deg. | Radians | Radians | Deg. |
|---------|---------|------|----------|---------|--------|-----------|---------|------|
| π | 3.1416 | 180 | $\pi/2$ | 1.5708 | 90 | $2\pi/3$ | 2.0944 | 120 |
| 2π | 6.2832 | 360 | $\pi/3$ | 1.0472 | 60 | $3\pi/4$ | 2.3562 | 135 |
| 3π | 9.4248 | 540 | $\pi/4$ | 0.7854 | 45 | $5\pi/6$ | 2.6180 | 150 |
| 4π | 12.5664 | 720 | $\pi/5$ | 0.6283 | 36 | $7\pi/6$ | 3.6652 | 210 |
| 5π | 15.7080 | 900 | $\pi/6$ | 0.5236 | 30 | $5\pi/4$ | 3.9270 | 225 |
| 6π | 18.8496 | 1080 | $\pi/7$ | 0.4488 | 25.714 | $4\pi/3$ | 4.1888 | 240 |
| 7π | 21.9911 | 1260 | $\pi/8$ | 0.3927 | 22.5 | $3\pi/2$ | 4.7124 | 270 |
| 8π | 25.1327 | 1440 | $\pi/9$ | 0.3491 | 20 | $5\pi/3$ | 5.2360 | 300 |
| 9π | 28.2743 | 1620 | $\pi/10$ | 0.3142 | 18 | $7\pi/4$ | 5.4978 | 315 |
| 10π | 31.4159 | 1800 | $\pi/12$ | 0.2618 | 15 | $11\pi/6$ | 5.7596 | 330 |

CONVERSION OF ANGLES FROM ARC TO TIME

| Arc | Time | Arc | Time | Arc | Time | Arc | Time |
|-----|------|-----|-------|-----|------|-----|------|
| ° | h m | ° | h m | " | s | " | s |
| ' | m s | ' | m s | | | | |
| 0 | 0 00 | 20 | 1 20 | 0 | 0.00 | 8 | 0.53 |
| 1 | 0 04 | 30 | 2 00 | 1 | 0.07 | 9 | 0.60 |
| 2 | 0 08 | 40 | 2 40 | 2 | 0.13 | 10 | 0.67 |
| 3 | 0 12 | 50 | 3 20 | 3 | 0.20 | 20 | 1.33 |
| 4 | 0 16 | 60 | 4 00 | 4 | 0.27 | 30 | 2.00 |
| 5 | 0 20 | 70 | 4 40 | 5 | 0.33 | 40 | 2.67 |
| 6 | 0 24 | 80 | 5 20 | 6 | 0.40 | 50 | 3.33 |
| 7 | 0 28 | 90 | 6 00 | 7 | 0.47 | 60 | 4.00 |
| 8 | 0 32 | 100 | 6 40 | | | | |
| 9 | 0 36 | 200 | 13 20 | | | | |
| 10 | 0 40 | 300 | 20 00 | | | | |

MINUTES AND SECONDS TO DECIMAL PARTS OF A DEGREE

| MINUTES AND SECONDS TO DECIMAL PARTS OF A DEG. | | | DECIMAL PARTS OF A DEGREE TO MINUTES AND SECONDS | | |
|--|---------|--------------|--|----------|-------|
| Min. Degrees | | Sec. Degrees | Deg. ' " | Deg. ' " | |
| 0 | 0.00000 | 0 | 0.00000 | 0.60 | 36 |
| 1 | .01667 | 1 | .00028 | .61 | 36 36 |
| 2 | .03333 | 2 | .00056 | .62 | 37 12 |
| 3 | .05 | 3 | .00083 | .63 | 37 48 |
| 4 | .06667 | 4 | .00111 | .64 | 38 24 |
| 5 | .08333 | 5 | .00139 | .65 | 39 |
| 6 | .10 | 6 | .00167 | .66 | 39 36 |
| 7 | .11667 | 7 | .00194 | .67 | 40 12 |
| 8 | .13333 | 8 | .00222 | .68 | 40 48 |
| 9 | .15 | 9 | .0025 | .69 | 41 24 |
| 10 | 0.16667 | 10 | 0.00278 | 0.70 | 42 |
| 11 | .18333 | 11 | .00306 | .71 | 42 36 |
| 12 | .20 | 12 | .00333 | .72 | 43 12 |
| 13 | .21667 | 13 | .00361 | .73 | 43 48 |
| 14 | .23333 | 14 | .00389 | .74 | 44 24 |
| 15 | .25 | 15 | .00417 | .75 | 45 |
| 16 | .26667 | 16 | .00444 | .76 | 45 36 |
| 17 | .28333 | 17 | .00472 | .77 | 46 12 |
| 18 | .30 | 18 | .005 | .78 | 46 48 |
| 19 | .31667 | 19 | .00528 | .79 | 47 24 |
| 20 | 0.33333 | 20 | 0.00556 | 0.80 | 48 |
| 21 | .35 | 21 | .00583 | .81 | 48 36 |
| 22 | .36667 | 22 | .00611 | .82 | 49 12 |
| 23 | .38333 | 23 | .00639 | .83 | 49 48 |
| 24 | .40 | 24 | .00667 | .84 | 50 24 |
| 25 | .41667 | 25 | .00694 | .85 | 51 |
| 26 | .43333 | 26 | .00722 | .86 | 51 36 |
| 27 | .45 | 27 | .0075 | .87 | 52 12 |
| 28 | .46667 | 28 | .00778 | .88 | 52 48 |
| 29 | .48333 | 29 | .00806 | .89 | 53 24 |
| 30 | 0.50 | 30 | 0.00833 | 0.90 | 54 |
| 31 | .51667 | 31 | .00861 | .91 | 54 36 |
| 32 | .53333 | 32 | .00889 | .92 | 55 12 |
| 33 | .55 | 33 | .00917 | .93 | 55 48 |
| 34 | .56667 | 34 | .00944 | .94 | 56 24 |
| 35 | .58333 | 35 | .00972 | .95 | 57 |
| 36 | .60 | 36 | .01 | .96 | 57 36 |
| 37 | .61667 | 37 | .01028 | .97 | 58 12 |
| 38 | .63333 | 38 | .01056 | .98 | 58 48 |
| 39 | .65 | 39 | .01083 | .99 | 59 24 |
| 40 | 0.66667 | 40 | 0.01111 | 1.00 | 60 |
| 41 | .68333 | 41 | .01139 | | |
| 42 | .70 | 42 | .01167 | | |
| 43 | .71667 | 43 | .01194 | | |
| 44 | .73333 | 44 | .01222 | | |
| 45 | .75 | 45 | .0125 | | |
| 46 | .76667 | 46 | .01278 | | |
| 47 | .78333 | 47 | .01306 | | |
| 48 | .80 | 48 | .01333 | | |
| 49 | .81667 | 49 | .01361 | | |
| 50 | 0.83333 | 50 | 0.01389 | | |
| 51 | .85 | 51 | .01417 | | |
| 52 | .86667 | 52 | .01444 | | |
| 53 | .88333 | 53 | .01472 | | |
| 54 | .90 | 54 | .015 | | |
| 55 | .91667 | 55 | .01528 | | |
| 56 | .93333 | 56 | .01556 | | |
| 57 | .95 | 57 | .01583 | | |
| 58 | .96667 | 58 | .01611 | | |
| 59 | .98333 | 59 | .01639 | | |
| 60 | 1.00 | 60 | 0.01667 | | |

| Deg. | Sec. |
|-------|------|
| 0.000 | 0.0 |
| .001 | 3.6 |
| .002 | 7.2 |
| .003 | 10.8 |
| .004 | 14.4 |
| .005 | 18. |
| .006 | 21.6 |
| .007 | 25.2 |
| .008 | 28.8 |
| .009 | 32.4 |
| 0.010 | 36. |

NUMERICAL TABLES

Reciprocals, Circumference and Area of Circles

As a matter of convenience, the values of $1000 \times (1/n)$ are given in the table. To obtain the actual value of the reciprocal, shift the decimal point three places to the left.

Circumferences and areas of circles are given for the values of n as the diameter.

| n | $\frac{1}{1000-n}$ | Circumference πn | Area $\frac{\pi n^2}{4}$ | n | $\frac{1}{1000-n}$ | Circumference πn | Area $\frac{\pi n^2}{4}$ |
|-----|--------------------|--------------------------|-----------------------------|-----|--------------------|--------------------------|-----------------------------|
| 0 | ∞ | 0.000000 | 0.000000 | 50 | 20.00000 | 157.0796 | 1963.495 |
| 1 | 1000.000 | 3.141593 | .7853982 | 51 | 19.60784 | 160.2212 | 2042.821 |
| 2 | 500.0000 | 6.283185 | 3.141593 | 52 | 19.23077 | 163.3628 | 2123.717 |
| 3 | 333.3333 | 9.424778 | 7.068583 | 53 | 18.86792 | 166.5044 | 2206.183 |
| 4 | 250.0000 | 12.56637 | 12.56637 | 54 | 18.51852 | 169.6460 | 2290.221 |
| 5 | 200.0000 | 15.70796 | 19.63495 | 55 | 18.18182 | 172.7876 | 2375.829 |
| 6 | 166.6667 | 18.84956 | 28.27433 | 56 | 17.85714 | 175.9292 | 2463.009 |
| 7 | 142.8571 | 21.99115 | 38.48451 | 57 | 17.54386 | 179.0708 | 2551.759 |
| 8 | 125.0000 | 25.13274 | 50.26548 | 58 | 17.24138 | 182.2124 | 2642.079 |
| 9 | 111.1111 | 28.27433 | 63.61725 | 59 | 16.94915 | 185.3540 | 2733.971 |
| 10 | 100.0000 | 31.41593 | 78.53982 | 60 | 16.66667 | 188.4956 | 2827.433 |
| 11 | 90.90909 | 34.55752 | 95.03318 | 61 | 16.39344 | 191.6372 | 2922.467 |
| 12 | 83.33333 | 37.69911 | 113.0973 | 62 | 16.12903 | 194.7787 | 3019.071 |
| 13 | 76.92308 | 40.84070 | 132.7323 | 63 | 15.87302 | 197.9203 | 3117.245 |
| 14 | 71.42857 | 43.98230 | 153.9380 | 64 | 15.62500 | 201.0619 | 3216.991 |
| 15 | 66.66667 | 47.12389 | 176.7146 | 65 | 15.38462 | 204.2035 | 3318.307 |
| 16 | 62.50000 | 50.26548 | 201.0619 | 66 | 15.15152 | 207.3451 | 3421.194 |
| 17 | 58.82353 | 53.40708 | 226.9801 | 67 | 14.92537 | 210.4867 | 3525.652 |
| 18 | 55.55556 | 56.54867 | 254.4690 | 68 | 14.70588 | 213.6283 | 3631.681 |
| 19 | 52.63158 | 59.69026 | 283.5287 | 69 | 14.49275 | 216.7699 | 3739.281 |
| 20 | 50.00000 | 62.83185 | 314.1593 | 70 | 14.28571 | 219.9115 | 3848.451 |
| 21 | 47.61905 | 65.97345 | 346.3606 | 71 | 14.08451 | 223.0531 | 3959.192 |
| 22 | 45.45455 | 69.11504 | 380.1327 | 72 | 13.88889 | 226.1947 | 4071.504 |
| 23 | 43.47826 | 72.25663 | 415.4756 | 73 | 13.69863 | 229.3363 | 4185.387 |
| 24 | 41.66667 | 75.39822 | 452.3893 | 74 | 13.51351 | 232.4779 | 4300.840 |
| 25 | 40.00000 | 78.53982 | 490.8739 | 75 | 13.33333 | 235.6194 | 4417.865 |
| 26 | 38.46154 | 81.68141 | 530.9292 | 76 | 13.15789 | 238.7610 | 4536.460 |
| 27 | 37.03704 | 84.82300 | 572.5553 | 77 | 12.98701 | 241.9026 | 4656.626 |
| 28 | 35.71429 | 87.96459 | 615.7522 | 78 | 12.82051 | 245.0442 | 4778.362 |
| 29 | 34.48276 | 91.10619 | 660.5199 | 79 | 12.65823 | 248.1858 | 4901.670 |
| 30 | 33.33333 | 94.24778 | 706.8583 | 80 | 12.50000 | 251.3274 | 5026.548 |
| 31 | 32.25806 | 97.38937 | 754.7676 | 81 | 12.34568 | 254.4690 | 5152.997 |
| 32 | 31.25000 | 100.5310 | 804.2477 | 82 | 12.19512 | 257.6106 | 5281.017 |
| 33 | 30.30303 | 103.6726 | 855.2986 | 83 | 12.04819 | 260.7522 | 5410.608 |
| 34 | 29.41176 | 106.8142 | 907.9203 | 84 | 11.90476 | 263.8938 | 5541.769 |
| 35 | 28.57143 | 109.9557 | 962.1128 | 85 | 11.76471 | 267.0354 | 5674.502 |
| 36 | 27.77778 | 113.0973 | 1017.876 | 86 | 11.62791 | 270.1770 | 5808.805 |
| 37 | 27.02703 | 116.2389 | 1075.210 | 87 | 11.49425 | 273.3186 | 5944.679 |
| 38 | 26.31579 | 119.3805 | 1134.115 | 88 | 11.36364 | 276.4602 | 6082.123 |
| 39 | 25.64103 | 122.5221 | 1194.591 | 89 | 11.23596 | 279.6017 | 6221.139 |
| 40 | 25.00000 | 125.6637 | 1256.637 | 90 | 11.11111 | 282.7433 | 6361.725 |
| 41 | 24.39024 | 128.8053 | 1320.254 | 91 | 10.98901 | 285.8849 | 6503.882 |
| 42 | 23.80952 | 131.9469 | 1385.442 | 92 | 10.86957 | 289.0265 | 6647.610 |
| 43 | 23.25581 | 135.0885 | 1452.201 | 93 | 10.75269 | 292.1681 | 6792.909 |
| 44 | 22.72727 | 138.2301 | 1520.531 | 94 | 10.63830 | 295.3097 | 6939.778 |
| 45 | 22.22222 | 141.3717 | 1590.431 | 95 | 10.52632 | 298.4513 | 7088.218 |
| 46 | 21.73913 | 144.5133 | 1661.903 | 96 | 10.41667 | 301.5929 | 7238.229 |
| 47 | 21.27660 | 147.6549 | 1734.945 | 97 | 10.30928 | 304.7345 | 7389.811 |
| 48 | 20.83333 | 150.7964 | 1809.557 | 98 | 10.20408 | 307.8761 | 7542.964 |
| 49 | 20.40816 | 153.9380 | 1885.741 | 99 | 10.10101 | 311.0177 | 7697.687 |
| 50 | 20.00000 | 157.0796 | 1963.495 | 100 | 10.00000 | 314.1593 | 7853.982 |

RECIPROCAL, CIRCUMFERENCE AND AREA OF CIRCLES (Continued)

| n | $\frac{1}{1000-n}$ | Circumference πn | Area $\frac{\pi n^2}{4}$ | n | $\frac{1}{1000-n}$ | Circumference πn | Area $\frac{\pi n^2}{4}$ |
|-----|--------------------|--------------------------|-----------------------------|-----|--------------------|--------------------------|-----------------------------|
| 100 | 10.00000 | 314.1593 | 7853.982 | 150 | 6.666 667 | 471.2389 | 17671.46 |
| 101 | 9.900 990 | 317.3009 | 8011.847 | 151 | 6.622 517 | 474.3805 | 17907.86 |
| 102 | 9.803 922 | 320.4425 | 8171.282 | 152 | 6.578 947 | 477.5221 | 18145.84 |
| 103 | 9.708 738 | 323.5840 | 8332.289 | 153 | 6.535 948 | 480.6637 | 18385.39 |
| 104 | 9.615 385 | 326.7256 | 8494.867 | 154 | 6.493 506 | 483.8053 | 18626.50 |
| 105 | 9.523 810 | 329.8672 | 8659.015 | 155 | 6.451 613 | 486.9469 | 18869.19 |
| 106 | 9.433 962 | 333.0088 | 8824.734 | 156 | 6.410 256 | 490.0885 | 19113.45 |
| 107 | 9.345 794 | 336.1504 | 8992.024 | 157 | 6.369 427 | 493.2300 | 19359.28 |
| 108 | 9.259 259 | 339.2920 | 9160.884 | 158 | 6.329 114 | 496.3716 | 19606.68 |
| 109 | 9.174 312 | 342.4336 | 9331.316 | 159 | 6.289 308 | 499.5132 | 19855.65 |
| 110 | 9.090 909 | 345.5752 | 9503.318 | 160 | 6.250 000 | 502.6548 | 20106.19 |
| 111 | 9.009 009 | 348.7168 | 9676.891 | 161 | 6.211 180 | 505.7964 | 20358.31 |
| 112 | 8.928 571 | 351.8584 | 9852.035 | 162 | 6.172 840 | 508.9380 | 20611.99 |
| 113 | 8.849 558 | 355.0000 | 10028.75 | 163 | 6.134 969 | 512.0796 | 20867.24 |
| 114 | 8.771 930 | 358.1416 | 10207.03 | 164 | 6.097 561 | 515.2212 | 21124.07 |
| 115 | 8.695 652 | 361.2832 | 10386.89 | 165 | 6.060 606 | 518.3628 | 21382.46 |
| 116 | 8.620 690 | 364.4247 | 10568.32 | 166 | 6.024 096 | 521.5044 | 21642.43 |
| 117 | 8.547 009 | 367.5663 | 10751.32 | 167 | 5.988 024 | 524.6460 | 21903.97 |
| 118 | 8.474 576 | 370.7079 | 10935.88 | 168 | 5.952 381 | 527.7876 | 22167.08 |
| 119 | 8.403 361 | 373.8495 | 11122.02 | 169 | 5.917 160 | 530.9292 | 22431.76 |
| 120 | 8.333 333 | 376.9911 | 11309.73 | 170 | 5.882 353 | 534.0708 | 22698.01 |
| 121 | 8.264 463 | 380.1327 | 11499.01 | 171 | 5.847 953 | 537.2123 | 22965.83 |
| 122 | 8.196 721 | 383.2743 | 11689.87 | 172 | 5.813 953 | 540.3539 | 23235.22 |
| 123 | 8.130 081 | 386.4159 | 11882.29 | 173 | 5.780 347 | 543.4955 | 23506.18 |
| 124 | 8.064 516 | 389.5575 | 12076.28 | 174 | 5.747 126 | 546.6371 | 23778.71 |
| 125 | 8.000 000 | 392.6991 | 12271.85 | 175 | 5.714 286 | 549.7787 | 24052.82 |
| 126 | 7.936 508 | 395.8407 | 12468.98 | 176 | 5.681 818 | 552.9203 | 24328.49 |
| 127 | 7.874 016 | 398.9823 | 12667.69 | 177 | 5.649 718 | 556.0619 | 24605.74 |
| 128 | 7.812 500 | 402.1239 | 12867.96 | 178 | 5.617 978 | 559.2035 | 24884.56 |
| 129 | 7.751 938 | 405.2655 | 13069.81 | 179 | 5.586 592 | 562.3451 | 25164.94 |
| 130 | 7.692 308 | 408.4070 | 13273.23 | 180 | 5.555 556 | 565.4867 | 25446.90 |
| 131 | 7.633 588 | 411.5486 | 13478.22 | 181 | 5.524 862 | 568.6283 | 25730.43 |
| 132 | 7.575 758 | 414.6902 | 13684.78 | 182 | 5.494 505 | 571.7699 | 26015.53 |
| 133 | 7.518 797 | 417.8318 | 13892.91 | 183 | 5.464 481 | 574.9115 | 26302.20 |
| 134 | 7.462 687 | 420.9734 | 14102.61 | 184 | 5.434 783 | 578.0530 | 26590.44 |
| 135 | 7.407 407 | 424.1150 | 14313.88 | 185 | 5.405 405 | 581.1946 | 26880.25 |
| 136 | 7.352 941 | 427.2566 | 14526.72 | 186 | 5.376 344 | 584.3362 | 27171.63 |
| 137 | 7.299 270 | 430.3982 | 14741.14 | 187 | 5.347 594 | 587.4778 | 27464.59 |
| 138 | 7.246 377 | 433.5398 | 14957.12 | 188 | 5.319 149 | 590.6194 | 27759.11 |
| 139 | 7.194 245 | 436.6814 | 15174.68 | 189 | 5.291 005 | 593.7610 | 28055.21 |
| 140 | 7.142 857 | 439.8230 | 15393.80 | 190 | 5.263 158 | 596.9026 | 28352.87 |
| 141 | 7.092 199 | 442.9646 | 15614.50 | 191 | 5.235 602 | 600.0442 | 28652.11 |
| 142 | 7.042 254 | 446.1062 | 15836.77 | 192 | 5.208 333 | 603.1858 | 28952.92 |
| 143 | 6.993 007 | 449.2477 | 16060.61 | 193 | 5.181 347 | 606.3274 | 29255.30 |
| 144 | 6.944 444 | 452.3893 | 16286.02 | 194 | 5.154 639 | 609.4690 | 29559.25 |
| 145 | 6.896 552 | 455.5309 | 16513.00 | 195 | 5.128 205 | 612.6106 | 29864.77 |
| 146 | 6.849 315 | 458.6725 | 16741.55 | 196 | 5.102 041 | 615.7522 | 30171.86 |
| 147 | 6.802 721 | 461.8141 | 16971.67 | 197 | 5.076 142 | 618.8938 | 30480.52 |
| 148 | 6.756 757 | 464.9557 | 17203.36 | 198 | 5.050 505 | 622.0353 | 30790.75 |
| 149 | 6.711 409 | 468.0973 | 17436.62 | 199 | 5.025 126 | 625.1769 | 31102.55 |
| 150 | 6.666 667 | 471.2389 | 17671.46 | 200 | 5.000 000 | 628.3185 | 31415.93 |

RECIPROCAL, CIRCUMFERENCE AND AREA OF CIRCLES (Continued)

| n | $\frac{1}{1000-n}$ | Circumference πn | Area $\frac{\pi n^2}{4}$ | n | $\frac{1}{1000-n}$ | Circumference πn | Area $\frac{\pi n^2}{4}$ |
|-----|--------------------|--------------------------|-----------------------------|-----|--------------------|--------------------------|-----------------------------|
| 200 | 5.000 000 | 628.3185 | 31415.93 | 250 | 4.000 000 | 785.3982 | 49087.39 |
| 201 | 4.975 124 | 631.4601 | 31730.87 | 251 | 3.984 064 | 788.5398 | 49480.87 |
| 202 | 4.950 495 | 634.6017 | 32047.39 | 252 | 3.968 254 | 791.6813 | 49875.92 |
| 203 | 4.926 108 | 637.7433 | 32365.47 | 253 | 3.952 569 | 794.8229 | 50272.55 |
| 204 | 4.901 961 | 640.8849 | 32685.13 | 254 | 3.937 008 | 797.9645 | 50670.75 |
| 205 | 4.878 049 | 644.0265 | 33006.36 | 255 | 3.921 569 | 801.1061 | 51070.52 |
| 206 | 4.854 369 | 647.1681 | 33329.16 | 256 | 3.906 250 | 804.2477 | 51471.85 |
| 207 | 4.830 918 | 650.3097 | 33653.53 | 257 | 3.891 051 | 807.3893 | 51874.76 |
| 208 | 4.807 692 | 653.4513 | 33979.47 | 258 | 3.875 969 | 810.5309 | 52279.24 |
| 209 | 4.784 689 | 656.5929 | 34306.98 | 259 | 3.861 004 | 813.6725 | 52685.29 |
| 210 | 4.761 905 | 659.7345 | 34636.06 | 260 | 3.846 154 | 816.8141 | 53092.92 |
| 211 | 4.739 336 | 662.8760 | 34966.71 | 261 | 3.831 418 | 819.9557 | 53502.11 |
| 212 | 4.716 981 | 666.0176 | 35298.94 | 262 | 3.816 794 | 823.0973 | 53912.87 |
| 213 | 4.694 836 | 669.1592 | 35632.73 | 263 | 3.802 281 | 826.2389 | 54325.21 |
| 214 | 4.672 897 | 672.3008 | 35968.09 | 264 | 3.787 879 | 829.3805 | 54739.11 |
| 215 | 4.651 163 | 675.4424 | 36305.03 | 265 | 3.773 585 | 832.5221 | 55154.59 |
| 216 | 4.629 630 | 678.5840 | 36643.54 | 266 | 3.759 398 | 835.6636 | 55571.63 |
| 217 | 4.608 295 | 681.7256 | 36983.61 | 267 | 3.745 318 | 838.8052 | 55990.25 |
| 218 | 4.587 156 | 684.8672 | 37325.26 | 268 | 3.731 343 | 841.9468 | 56410.44 |
| 219 | 4.566 210 | 688.0088 | 37668.48 | 269 | 3.717 472 | 845.0884 | 56832.20 |
| 220 | 4.545 455 | 691.1504 | 38013.27 | 270 | 3.703 704 | 848.2300 | 57255.53 |
| 221 | 4.524 887 | 694.2920 | 38359.63 | 271 | 3.690 037 | 851.3716 | 57680.43 |
| 222 | 4.504 505 | 697.4336 | 38707.56 | 272 | 3.676 471 | 854.5132 | 58106.90 |
| 223 | 4.484 305 | 700.5752 | 39057.07 | 273 | 3.663 004 | 857.6548 | 58534.94 |
| 224 | 4.464 286 | 703.7168 | 39408.14 | 274 | 3.649 635 | 860.7964 | 58964.65 |
| 225 | 4.444 444 | 706.8583 | 39760.78 | 275 | 3.636 364 | 863.9380 | 59395.74 |
| 226 | 4.424 779 | 709.9999 | 40115.00 | 276 | 3.623 188 | 867.0796 | 59828.49 |
| 227 | 4.405 286 | 713.1415 | 40470.78 | 277 | 3.610 108 | 870.2212 | 60262.82 |
| 228 | 4.385 965 | 716.2831 | 40828.14 | 278 | 3.597 122 | 873.3628 | 60698.71 |
| 229 | 4.366 812 | 719.4247 | 41187.07 | 279 | 3.584 229 | 876.5044 | 61136.18 |
| 230 | 4.347 826 | 722.5663 | 41547.56 | 280 | 3.571 429 | 879.6459 | 61575.22 |
| 231 | 4.329 004 | 725.7079 | 41909.63 | 281 | 3.558 719 | 882.7875 | 62015.82 |
| 232 | 4.310 345 | 728.8495 | 42273.27 | 282 | 3.546 099 | 885.9291 | 62458.00 |
| 233 | 4.291 845 | 731.9911 | 42638.48 | 283 | 3.533 569 | 889.0707 | 62901.75 |
| 234 | 4.273 504 | 735.1327 | 43005.26 | 284 | 3.521 127 | 892.2123 | 63347.07 |
| 235 | 4.255 319 | 738.2743 | 43373.61 | 285 | 3.508 772 | 895.3539 | 63793.97 |
| 236 | 4.237 288 | 741.4159 | 43743.54 | 286 | 3.496 503 | 898.4955 | 64242.43 |
| 237 | 4.219 409 | 744.5575 | 44115.03 | 287 | 3.484 321 | 901.6371 | 64692.46 |
| 238 | 4.201 681 | 747.6991 | 44488.09 | 288 | 3.472 222 | 904.7787 | 65144.07 |
| 239 | 4.184 100 | 750.8406 | 44862.73 | 289 | 3.460 208 | 907.9203 | 65597.24 |
| 240 | 4.166 667 | 753.9822 | 45238.93 | 290 | 3.448 276 | 911.0619 | 66051.99 |
| 241 | 4.149 378 | 757.1238 | 45616.71 | 291 | 3.436 426 | 914.2035 | 66508.30 |
| 242 | 4.132 231 | 760.2654 | 45996.06 | 292 | 3.424 658 | 917.3451 | 66966.19 |
| 243 | 4.115 226 | 763.4070 | 46376.98 | 293 | 3.412 969 | 920.4866 | 67425.65 |
| 244 | 4.098 361 | 766.5486 | 46759.47 | 294 | 3.401 361 | 923.6282 | 67886.68 |
| 245 | 4.081 633 | 769.6902 | 47143.52 | 295 | 3.389 831 | 926.7698 | 68349.28 |
| 246 | 4.065 041 | 772.8318 | 47529.16 | 296 | 3.378 378 | 929.9114 | 68813.45 |
| 247 | 4.048 583 | 775.9734 | 47916.36 | 297 | 3.367 003 | 933.0530 | 69279.19 |
| 248 | 4.032 258 | 779.1150 | 48305.13 | 298 | 3.355 705 | 936.1946 | 69746.50 |
| 249 | 4.016 064 | 782.2566 | 48695.47 | 299 | 3.344 482 | 939.3362 | 70215.38 |
| 250 | 4.000 000 | 785.3982 | 49087.39 | 300 | 3.333 333 | 942.4778 | 70685.83 |

RECIPROCAL, CIRCUMFERENCE AND AREA OF CIRCLES (Continued)

| n | $\frac{1}{1000-n}$ | Circumference πn | Area $\frac{\pi n^2}{4}$ | n | $\frac{1}{1000-n}$ | Circumference πn | Area $\frac{\pi n^2}{4}$ |
|-----|--------------------|--------------------------|-----------------------------|-----|--------------------|--------------------------|-----------------------------|
| 300 | 3.333 333 | 942.4778 | 70685.83 | 350 | 2.857 143 | 1099.557 | 96211.28 |
| 301 | 3.322 259 | 945.6194 | 71157.86 | 351 | 2.849 003 | 1102.699 | 96761.84 |
| 302 | 3.311 258 | 948.7610 | 71631.45 | 352 | 2.840 909 | 1105.841 | 97313.97 |
| 303 | 3.300 330 | 951.9026 | 72106.62 | 353 | 2.832 861 | 1108.982 | 97867.68 |
| 304 | 3.289 474 | 955.0442 | 72583.36 | 354 | 2.824 859 | 1112.124 | 98422.96 |
| 305 | 3.278 689 | 958.1858 | 73061.66 | 355 | 2.816 901 | 1115.265 | 98979.80 |
| 306 | 3.267 974 | 961.3274 | 73541.54 | 356 | 2.808 989 | 1118.407 | 99538.22 |
| 307 | 3.257 329 | 964.4689 | 74022.99 | 357 | 2.801 120 | 1121.549 | 100 098.2 |
| 308 | 3.246 753 | 967.6105 | 74506.01 | 358 | 2.793 296 | 1124.690 | 100 659.8 |
| 309 | 3.236 246 | 970.7521 | 74990.60 | 359 | 2.785 515 | 1127.832 | 101 222.9 |
| 310 | 3.225 806 | 973.8937 | 75476.76 | 360 | 2.777 778 | 1130.973 | 101 787.6 |
| 311 | 3.215 434 | 977.0353 | 75964.50 | 361 | 2.770 083 | 1134.115 | 102 353.9 |
| 312 | 3.205 128 | 980.1769 | 76453.80 | 362 | 2.762 431 | 1137.257 | 102 921.7 |
| 313 | 3.194 888 | 983.3185 | 76944.67 | 363 | 2.754 821 | 1140.398 | 103 491.1 |
| 314 | 3.184 713 | 986.4601 | 77437.12 | 364 | 2.747 253 | 1143.540 | 104 062.1 |
| 315 | 3.174 603 | 989.6017 | 77931.13 | 365 | 2.739 726 | 1146.681 | 104 634.7 |
| 316 | 3.164 557 | 992.7433 | 78426.72 | 366 | 2.732 240 | 1149.823 | 105 208.8 |
| 317 | 3.154 574 | 995.8849 | 78923.38 | 367 | 2.724 796 | 1152.965 | 105 784.5 |
| 318 | 3.144 654 | 999.0265 | 79422.60 | 368 | 2.717 391 | 1156.106 | 106 361.8 |
| 319 | 3.134 796 | 1002.168 | 79922.90 | 369 | 2.710 027 | 1159.248 | 106 940.6 |
| 320 | 3.125 000 | 1005.310 | 80424.77 | 370 | 2.702 703 | 1162.389 | 107 521.0 |
| 321 | 3.115 265 | 1008.451 | 80928.21 | 371 | 2.695 418 | 1165.531 | 108 103.0 |
| 322 | 3.105 590 | 1011.593 | 81433.22 | 372 | 2.688 172 | 1168.672 | 108 686.6 |
| 323 | 3.095 975 | 1014.734 | 81939.80 | 373 | 2.680 965 | 1171.814 | 109 271.7 |
| 324 | 3.086 420 | 1017.876 | 82447.96 | 374 | 2.673 797 | 1174.956 | 109 858.4 |
| 325 | 3.076 923 | 1021.018 | 82957.68 | 375 | 2.666 667 | 1178.097 | 110 446.6 |
| 326 | 3.067 485 | 1024.159 | 83468.98 | 376 | 2.659 574 | 1181.239 | 111 036.6 |
| 327 | 3.058 104 | 1027.301 | 83981.84 | 377 | 2.652 520 | 1184.380 | 111 627.9 |
| 328 | 3.048 780 | 1030.442 | 84496.28 | 378 | 2.645 503 | 1187.522 | 112 220.8 |
| 329 | 3.039 514 | 1033.584 | 85012.28 | 379 | 2.638 522 | 1190.664 | 112 815.4 |
| 330 | 3.030 303 | 1036.726 | 85529.86 | 380 | 2.631 579 | 1193.805 | 113 411.5 |
| 331 | 3.021 148 | 1039.867 | 86049.01 | 381 | 2.624 672 | 1196.947 | 114 009.2 |
| 332 | 3.012 048 | 1043.009 | 86569.73 | 382 | 2.617 801 | 1200.088 | 114 608.4 |
| 333 | 3.003 003 | 1046.150 | 87092.02 | 383 | 2.610 966 | 1203.230 | 115 209.3 |
| 334 | 2.994 012 | 1049.292 | 87615.88 | 384 | 2.604 167 | 1206.372 | 115 811.7 |
| 335 | 2.985 075 | 1052.434 | 88141.31 | 385 | 2.597 403 | 1209.513 | 116 415.6 |
| 336 | 2.976 190 | 1055.575 | 88668.31 | 386 | 2.590 674 | 1212.655 | 117 021.2 |
| 337 | 2.967 359 | 1058.717 | 89196.88 | 387 | 2.583 979 | 1215.796 | 117 628.3 |
| 338 | 2.958 580 | 1061.858 | 89727.03 | 388 | 2.577 320 | 1218.938 | 118 237.0 |
| 339 | 2.949 853 | 1065.000 | 90258.74 | 389 | 2.570 694 | 1222.080 | 118 847.2 |
| 340 | 2.941 176 | 1068.142 | 90792.03 | 390 | 2.564 103 | 1225.221 | 119 459.1 |
| 341 | 2.932 551 | 1071.283 | 91326.88 | 391 | 2.557 545 | 1228.363 | 120 072.5 |
| 342 | 2.923 977 | 1074.425 | 91863.31 | 392 | 2.551 020 | 1231.504 | 120 687.4 |
| 343 | 2.915 452 | 1077.566 | 92401.31 | 393 | 2.544 529 | 1234.646 | 121 304.0 |
| 344 | 2.906 977 | 1080.708 | 92940.88 | 394 | 2.538 071 | 1237.788 | 121 922.1 |
| 345 | 2.898 551 | 1083.849 | 93482.02 | 395 | 2.531 646 | 1240.929 | 122 541.7 |
| 346 | 2.890 173 | 1086.991 | 94024.73 | 396 | 2.525 253 | 1244.071 | 123 163.0 |
| 347 | 2.881 844 | 1090.133 | 94569.01 | 397 | 2.518 892 | 1247.212 | 123 785.8 |
| 348 | 2.873 563 | 1093.274 | 95114.86 | 398 | 2.512 563 | 1250.354 | 124 410.2 |
| 349 | 2.865 330 | 1096.416 | 95662.28 | 399 | 2.506 266 | 1253.495 | 125 036.2 |
| 350 | 2.857 143 | 1099.557 | 96211.28 | 400 | 2.500 000 | 1256.637 | 125 668.7 |

RECIPROCAL, CIRCUMFERENCE AND AREA OF CIRCLES (Continued)

| n | $\frac{1}{1000-n}$ | Circumference πn | Area $\frac{\pi n^2}{4}$ | | $\frac{1}{1000-n}$ | Circumference πn | Area $\frac{\pi n^2}{4}$ |
|-----|--------------------|--------------------------|-----------------------------|-----|--------------------|--------------------------|-----------------------------|
| 400 | 2.500 000 | 1256.637 | 125 663.7 | 450 | 2.222 222 | 1413.717 | 159 043.1 |
| 401 | 2.493 766 | 1259.779 | 126 292.8 | 451 | 2.217 295 | 1416.858 | 159 750.8 |
| 402 | 2.487 562 | 1262.920 | 126 923.5 | 452 | 2.212 389 | 1420.000 | 160 460.0 |
| 403 | 2.481 390 | 1266.062 | 127 555.7 | 453 | 2.207 506 | 1423.141 | 161 170.8 |
| 404 | 2.475 248 | 1269.203 | 128 189.5 | 454 | 2.202 643 | 1426.283 | 161 883.1 |
| 405 | 2.469 136 | 1272.345 | 128 824.9 | 455 | 2.197 802 | 1429.425 | 162 597.1 |
| 406 | 2.463 054 | 1275.487 | 129 461.9 | 456 | 2.192 982 | 1432.566 | 163 312.6 |
| 407 | 2.457 002 | 1278.628 | 130 100.4 | 457 | 2.188 184 | 1435.708 | 164 029.6 |
| 408 | 2.450 980 | 1281.770 | 130 740.5 | 458 | 2.183 406 | 1438.849 | 164 748.3 |
| 409 | 2.444 988 | 1284.911 | 131 382.2 | 459 | 2.178 649 | 1441.991 | 165 468.5 |
| 410 | 2.439 024 | 1288.053 | 132 025.4 | 460 | 2.173 913 | 1445.133 | 166 190.3 |
| 411 | 2.433 090 | 1291.195 | 132 670.2 | 461 | 2.169 197 | 1448.274 | 166 913.6 |
| 412 | 2.427 184 | 1294.336 | 133 316.6 | 462 | 2.164 502 | 1451.416 | 167 638.5 |
| 413 | 2.421 308 | 1297.478 | 133 964.6 | 463 | 2.159 827 | 1454.557 | 168 365.0 |
| 414 | 2.415 459 | 1300.619 | 134 614.1 | 464 | 2.155 172 | 1457.699 | 169 093.1 |
| 415 | 2.409 639 | 1303.761 | 135 265.2 | 465 | 2.150 538 | 1460.841 | 169 822.7 |
| 416 | 2.403 846 | 1306.903 | 135 917.9 | 466 | 2.145 923 | 1463.982 | 170 553.9 |
| 417 | 2.398 082 | 1310.044 | 136 572.1 | 467 | 2.141 328 | 1467.124 | 171 286.7 |
| 418 | 2.392 344 | 1313.186 | 137 227.9 | 468 | 2.136 752 | 1470.265 | 172 021.0 |
| 419 | 2.386 635 | 1316.327 | 137 885.3 | 469 | 2.132 196 | 1473.407 | 172 757.0 |
| 420 | 2.380 952 | 1319.469 | 138 544.2 | 470 | 2.127 660 | 1476.549 | 173 494.5 |
| 421 | 2.375 297 | 1322.611 | 139 204.8 | 471 | 2.123 142 | 1479.690 | 174 233.5 |
| 422 | 2.369 668 | 1325.752 | 139 866.8 | 472 | 2.118 644 | 1482.832 | 174 974.1 |
| 423 | 2.364 066 | 1328.894 | 140 530.5 | 473 | 2.114 165 | 1485.973 | 175 716.3 |
| 424 | 2.358 491 | 1332.035 | 141 195.7 | 474 | 2.109 705 | 1489.115 | 176 460.1 |
| 425 | 2.352 941 | 1335.177 | 141 862.5 | 475 | 2.105 263 | 1492.257 | 177 205.5 |
| 426 | 2.347 418 | 1338.318 | 142 530.9 | 476 | 2.100 840 | 1495.398 | 177 952.4 |
| 427 | 2.341 920 | 1341.460 | 143 200.9 | 477 | 2.096 436 | 1498.540 | 178 700.9 |
| 428 | 2.336 449 | 1344.602 | 143 872.4 | 478 | 2.092 050 | 1501.681 | 179 450.9 |
| 429 | 2.331 002 | 1347.743 | 144 545.5 | 479 | 2.087 683 | 1504.823 | 180 202.5 |
| 430 | 2.325 581 | 1350.885 | 145 220.1 | 480 | 2.083 333 | 1507.964 | 180 955.7 |
| 431 | 2.320 186 | 1354.026 | 145 896.3 | 481 | 2.079 002 | 1511.106 | 181 710.5 |
| 432 | 2.314 815 | 1357.168 | 146 574.1 | 482 | 2.074 689 | 1514.248 | 182 466.8 |
| 433 | 2.309 469 | 1360.310 | 147 253.5 | 483 | 2.070 393 | 1517.389 | 183 224.8 |
| 434 | 2.304 147 | 1363.451 | 147 934.5 | 484 | 2.066 116 | 1520.531 | 183 984.2 |
| 435 | 2.298 851 | 1366.593 | 148 617.0 | 485 | 2.061 856 | 1523.672 | 184 745.3 |
| 436 | 2.293 578 | 1369.734 | 149 301.0 | 486 | 2.057 613 | 1526.814 | 185 507.9 |
| 437 | 2.288 330 | 1372.876 | 149 986.7 | 487 | 2.053 388 | 1529.956 | 186 272.1 |
| 438 | 2.283 105 | 1376.018 | 150 673.9 | 488 | 2.049 180 | 1533.097 | 187 037.9 |
| 439 | 2.277 904 | 1379.159 | 151 362.7 | 489 | 2.044 990 | 1536.239 | 187 805.2 |
| 440 | 2.272 727 | 1382.301 | 152 053.1 | 490 | 2.040 816 | 1539.380 | 188 574.1 |
| 441 | 2.267 574 | 1385.442 | 152 745.0 | 491 | 2.036 660 | 1542.522 | 189 344.6 |
| 442 | 2.262 443 | 1388.584 | 153 438.5 | 492 | 2.032 520 | 1545.664 | 190 116.6 |
| 443 | 2.257 336 | 1391.726 | 154 133.6 | 493 | 2.028 398 | 1548.805 | 190 890.2 |
| 444 | 2.252 252 | 1394.867 | 154 830.3 | 494 | 2.024 291 | 1551.947 | 191 665.4 |
| 445 | 2.247 191 | 1398.009 | 155 528.5 | 495 | 2.020 202 | 1555.088 | 192 442.2 |
| 446 | 2.242 152 | 1401.150 | 156 228.3 | 496 | 2.016 129 | 1558.230 | 193 220.5 |
| 447 | 2.237 136 | 1404.292 | 156 929.6 | 497 | 2.012 072 | 1561.372 | 194 000.4 |
| 448 | 2.232 143 | 1407.434 | 157 632.6 | 498 | 2.008 032 | 1564.513 | 194 781.9 |
| 449 | 2.227 171 | 1410.575 | 158 337.1 | 499 | 2.004 008 | 1567.655 | 195 564.9 |
| 450 | 2.222 222 | 1413.717 | 159 043.1 | 500 | 2.000 000 | 1570.796 | 196 349.5 |

RECIPROCAL, CIRCUMFERENCE AND AREA OF CIRCLES (Continued)

| n | $\frac{1}{1000-n}$ | Circumference πn | Area $\frac{\pi n^2}{4}$ | n | $\frac{1}{1000-n}$ | Circumference πn | Area $\frac{\pi n^2}{4}$ |
|-----|--------------------|--------------------------|-----------------------------|-----|--------------------|--------------------------|-----------------------------|
| 500 | 2.000 000 | 1570.796 | 196 349.5 | 550 | 1.818 182 | 1727.876 | 237 582.9 |
| 501 | 1.996 008 | 1573.938 | 197 135.7 | 551 | 1.814 882 | 1731.018 | 238 447.1 |
| 502 | 1.992 032 | 1577.080 | 197 923.5 | 552 | 1.811 594 | 1734.159 | 239 314.4 |
| 503 | 1.988 072 | 1580.221 | 198 712.8 | 553 | 1.808 318 | 1737.301 | 240 181.8 |
| 504 | 1.984 127 | 1583.363 | 199 503.7 | 554 | 1.805 054 | 1740.442 | 241 051.3 |
| 505 | 1.980 198 | 1586.504 | 200 296.2 | 555 | 1.801 802 | 1743.584 | 241 922.3 |
| 506 | 1.976 285 | 1589.646 | 201 090.2 | 556 | 1.798 561 | 1746.726 | 242 794.8 |
| 507 | 1.972 387 | 1592.787 | 201 885.8 | 557 | 1.795 332 | 1749.867 | 243 669.0 |
| 508 | 1.968 504 | 1595.929 | 202 683.0 | 558 | 1.792 115 | 1753.009 | 244 544.7 |
| 509 | 1.964 637 | 1599.071 | 203 481.7 | 559 | 1.788 909 | 1756.150 | 245 422.0 |
| 510 | 1.960 784 | 1602.212 | 204 282.1 | 560 | 1.785 714 | 1759.292 | 246 300.9 |
| 511 | 1.956 947 | 1605.354 | 205 084.0 | 561 | 1.782 531 | 1762.433 | 247 181.3 |
| 512 | 1.953 125 | 1608.495 | 205 887.4 | 562 | 1.779 359 | 1765.575 | 248 063.3 |
| 513 | 1.949 318 | 1611.637 | 206 692.4 | 563 | 1.776 199 | 1768.717 | 248 946.9 |
| 514 | 1.945 525 | 1614.779 | 207 499.1 | 564 | 1.773 050 | 1771.858 | 249 832.0 |
| 515 | 1.941 748 | 1617.920 | 208 307.2 | 565 | 1.769 912 | 1775.000 | 250 718.7 |
| 516 | 1.937 984 | 1621.062 | 209 117.0 | 566 | 1.766 784 | 1778.141 | 251 607.0 |
| 517 | 1.934 236 | 1624.203 | 209 928.3 | 567 | 1.763 668 | 1781.283 | 252 496.9 |
| 518 | 1.930 502 | 1627.345 | 210 741.2 | 568 | 1.760 563 | 1784.425 | 253 388.3 |
| 519 | 1.926 782 | 1630.487 | 211 555.6 | 569 | 1.757 469 | 1787.566 | 254 281.3 |
| 520 | 1.923 077 | 1633.628 | 212 371.7 | 570 | 1.754 386 | 1790.708 | 255 175.9 |
| 521 | 1.919 386 | 1636.770 | 213 189.3 | 571 | 1.751 313 | 1793.849 | 256 072.0 |
| 522 | 1.915 709 | 1639.911 | 214 008.4 | 572 | 1.748 252 | 1796.991 | 256 969.7 |
| 523 | 1.912 046 | 1643.053 | 214 829.2 | 573 | 1.745 201 | 1800.133 | 257 869.1 |
| 524 | 1.908 397 | 1646.195 | 215 651.5 | 574 | 1.742 160 | 1803.274 | 258 769.8 |
| 525 | 1.904 762 | 1649.336 | 216 475.4 | 575 | 1.739 130 | 1806.416 | 259 672.3 |
| 526 | 1.901 141 | 1652.478 | 217 300.8 | 576 | 1.736 111 | 1809.557 | 260 576.3 |
| 527 | 1.897 533 | 1655.619 | 218 127.8 | 577 | 1.733 102 | 1812.699 | 261 481.8 |
| 528 | 1.893 939 | 1658.761 | 218 956.4 | 578 | 1.730 104 | 1815.841 | 262 389.0 |
| 529 | 1.890 359 | 1661.903 | 219 786.6 | 579 | 1.727 116 | 1818.982 | 263 297.7 |
| 530 | 1.886 792 | 1665.044 | 220 618.3 | 580 | 1.724 138 | 1822.124 | 264 207.9 |
| 531 | 1.883 239 | 1668.186 | 221 451.7 | 581 | 1.721 170 | 1825.265 | 265 119.8 |
| 532 | 1.879 699 | 1671.327 | 222 286.5 | 582 | 1.718 213 | 1828.407 | 266 033.2 |
| 533 | 1.876 173 | 1674.469 | 223 123.0 | 583 | 1.715 266 | 1831.549 | 266 948.2 |
| 534 | 1.872 659 | 1677.610 | 223 961.0 | 584 | 1.712 329 | 1834.690 | 267 864.8 |
| 535 | 1.869 159 | 1680.752 | 224 800.6 | 585 | 1.709 402 | 1837.832 | 268 782.9 |
| 536 | 1.865 672 | 1683.894 | 225 641.8 | 586 | 1.706 485 | 1840.973 | 269 702.6 |
| 537 | 1.862 197 | 1687.035 | 226 484.5 | 587 | 1.703 578 | 1844.115 | 270 623.9 |
| 538 | 1.858 736 | 1690.177 | 227 328.8 | 588 | 1.700 680 | 1847.256 | 271 546.7 |
| 539 | 1.855 288 | 1693.318 | 228 174.7 | 589 | 1.697 793 | 1850.398 | 272 471.1 |
| 540 | 1.851 852 | 1696.460 | 229 022.1 | 590 | 1.694 915 | 1853.540 | 273 397.1 |
| 541 | 1.848 429 | 1699.602 | 229 871.1 | 591 | 1.692 047 | 1856.681 | 274 324.7 |
| 542 | 1.845 018 | 1702.743 | 230 721.7 | 592 | 1.689 189 | 1859.823 | 275 253.8 |
| 543 | 1.841 621 | 1705.885 | 231 573.9 | 593 | 1.686 341 | 1862.964 | 276 184.5 |
| 544 | 1.838 235 | 1709.026 | 232 427.6 | 594 | 1.683 502 | 1866.106 | 277 116.7 |
| 545 | 1.834 862 | 1712.168 | 233 282.9 | 595 | 1.680 672 | 1869.248 | 278 050.6 |
| 546 | 1.831 502 | 1715.310 | 234 139.8 | 596 | 1.677 852 | 1872.389 | 278 986.0 |
| 547 | 1.828 154 | 1718.451 | 234 998.2 | 597 | 1.675 042 | 1875.531 | 279 923.0 |
| 548 | 1.824 818 | 1721.593 | 235 858.2 | 598 | 1.672 241 | 1878.672 | 280 861.5 |
| 549 | 1.821 494 | 1724.734 | 236 719.8 | 599 | 1.669 449 | 1881.814 | 281 801.6 |
| 550 | 1.818 182 | 1727.876 | 237 582.9 | 600 | 1.666 667 | 1884.956 | 282 743.3 |

RECIPROCAL, CIRCUMFERENCE AND AREA OF CIRCLES (Continued)

| n | $\frac{1}{1000-n}$ | Circumference πn | Area $\frac{\pi n^2}{4}$ | n | $\frac{1}{1000-n}$ | Circumference πn | Area $\frac{\pi n^2}{4}$ |
|-----|--------------------|--------------------------|-----------------------------|-----|--------------------|--------------------------|-----------------------------|
| 600 | 1.666 667 | 1884.956 | 282 743.3 | 650 | 1.538 462 | 2042.035 | 331 830.7 |
| 601 | 1.663 894 | 1888.097 | 283 686.6 | 651 | 1.536 098 | 2045.177 | 332 852.5 |
| 602 | 1.661 130 | 1891.239 | 284 631.4 | 652 | 1.533 742 | 2048.318 | 333 875.9 |
| 603 | 1.658 375 | 1894.380 | 285 577.8 | 653 | 1.531 394 | 2051.460 | 334 900.8 |
| 604 | 1.655 629 | 1897.522 | 286 525.8 | 654 | 1.529 052 | 2054.602 | 335 927.4 |
| 605 | 1.652 893 | 1900.664 | 287 475.4 | 655 | 1.526 718 | 2057.743 | 336 955.4 |
| 606 | 1.650 165 | 1903.805 | 288 426.5 | 656 | 1.524 390 | 2060.885 | 337 985.1 |
| 607 | 1.647 446 | 1906.947 | 289 379.2 | 657 | 1.522 070 | 2064.026 | 339 016.3 |
| 608 | 1.644 737 | 1910.088 | 290 333.4 | 658 | 1.519 757 | 2067.168 | 340 049.1 |
| 609 | 1.642 036 | 1913.230 | 291 289.3 | 659 | 1.517 451 | 2070.310 | 341 083.5 |
| 610 | 1.639 344 | 1916.372 | 292 246.7 | 660 | 1.515 152 | 2073.451 | 342 119.4 |
| 611 | 1.636 661 | 1919.513 | 293 205.6 | 661 | 1.512 859 | 2076.593 | 343 157.0 |
| 612 | 1.633 987 | 1922.655 | 294 166.2 | 662 | 1.510 574 | 2079.734 | 344 196.0 |
| 613 | 1.631 321 | 1925.796 | 295 128.3 | 663 | 1.508 296 | 2082.876 | 345 236.7 |
| 614 | 1.628 664 | 1928.938 | 296 092.0 | 664 | 1.506 024 | 2086.018 | 346 278.9 |
| 615 | 1.626 016 | 1932.079 | 297 057.2 | 665 | 1.503 759 | 2089.159 | 347 322.7 |
| 616 | 1.623 377 | 1935.221 | 298 024.0 | 666 | 1.501 502 | 2092.301 | 348 368.1 |
| 617 | 1.620 746 | 1938.363 | 298 992.4 | 667 | 1.499 250 | 2095.442 | 349 415.0 |
| 618 | 1.618 123 | 1941.504 | 299 962.4 | 668 | 1.497 006 | 2098.584 | 350 463.5 |
| 619 | 1.615 509 | 1944.646 | 300 933.9 | 669 | 1.494 768 | 2101.725 | 351 513.6 |
| 620 | 1.612 903 | 1947.787 | 301 907.1 | 670 | 1.492 537 | 2104.867 | 352 565.2 |
| 621 | 1.610 306 | 1950.929 | 302 881.7 | 671 | 1.490 313 | 2108.009 | 353 618.5 |
| 622 | 1.607 717 | 1954.071 | 303 858.0 | 672 | 1.488 095 | 2111.150 | 354 673.2 |
| 623 | 1.605 136 | 1957.212 | 304 835.8 | 673 | 1.485 884 | 2114.292 | 355 729.6 |
| 624 | 1.602 564 | 1960.354 | 305 815.2 | 674 | 1.483 680 | 2117.433 | 356 787.5 |
| 625 | 1.600 000 | 1963.495 | 306 796.2 | 675 | 1.481 481 | 2120.575 | 357 847.0 |
| 626 | 1.597 444 | 1966.637 | 307 778.7 | 676 | 1.479 290 | 2123.717 | 358 908.1 |
| 627 | 1.594 896 | 1969.779 | 308 762.8 | 677 | 1.477 105 | 2126.858 | 359 970.8 |
| 628 | 1.592 357 | 1972.920 | 309 748.5 | 678 | 1.474 926 | 2130.000 | 361 035.0 |
| 629 | 1.589 825 | 1976.062 | 310 735.7 | 679 | 1.472 754 | 2133.141 | 362 100.8 |
| 630 | 1.587 302 | 1979.203 | 311 724.5 | 680 | 1.470 588 | 2136.283 | 363 168.1 |
| 631 | 1.584 786 | 1982.345 | 312 714.9 | 681 | 1.468 429 | 2139.425 | 364 237.0 |
| 632 | 1.582 278 | 1985.437 | 313 706.9 | 682 | 1.466 276 | 2142.566 | 365 307.5 |
| 633 | 1.579 779 | 1988.628 | 314 700.4 | 683 | 1.464 129 | 2145.708 | 366 379.6 |
| 634 | 1.577 287 | 1991.770 | 315 695.5 | 684 | 1.461 988 | 2148.849 | 367 453.2 |
| 635 | 1.574 803 | 1994.911 | 316 692.2 | 685 | 1.459 854 | 2151.991 | 368 528.5 |
| 636 | 1.572 327 | 1998.053 | 317 690.4 | 686 | 1.457 726 | 2155.133 | 369 605.2 |
| 637 | 1.569 859 | 2001.195 | 318 690.2 | 687 | 1.455 604 | 2158.274 | 370 683.6 |
| 638 | 1.567 398 | 2004.336 | 319 691.6 | 688 | 1.453 488 | 2161.416 | 371 763.5 |
| 639 | 1.564 945 | 2007.478 | 320 694.6 | 689 | 1.451 379 | 2164.557 | 372 845.0 |
| 640 | 1.562 500 | 2010.619 | 321 699.1 | 690 | 1.449 275 | 2167.699 | 373 928.1 |
| 641 | 1.560 062 | 2013.761 | 322 705.2 | 691 | 1.447 178 | 2170.841 | 375 012.7 |
| 642 | 1.557 632 | 2016.902 | 323 712.8 | 692 | 1.445 087 | 2173.982 | 376 098.9 |
| 643 | 1.555 210 | 2020.044 | 324 722.1 | 693 | 1.443 001 | 2177.124 | 377 186.7 |
| 644 | 1.552 795 | 2023.186 | 325 732.9 | 694 | 1.440 922 | 2180.265 | 378 276.0 |
| 645 | 1.550 388 | 2026.327 | 326 745.3 | 695 | 1.438 849 | 2183.407 | 379 366.9 |
| 646 | 1.547 988 | 2029.469 | 327 759.2 | 696 | 1.436 782 | 2186.548 | 380 459.4 |
| 647 | 1.545 595 | 2032.610 | 328 774.7 | 697 | 1.434 720 | 2189.690 | 381 553.5 |
| 648 | 1.543 210 | 2035.752 | 329 791.8 | 698 | 1.432 665 | 2192.832 | 382 649.1 |
| 649 | 1.540 832 | 2038.894 | 330 810.5 | 699 | 1.430 615 | 2195.973 | 383 746.3 |
| 650 | 1.538 462 | 2042.035 | 331 830.7 | 700 | 1.428 571 | 2199.115 | 384 845.1 |

RECIPROCAL, CIRCUMFERENCE AND AREA OF CIRCLES (Continued)

| n | $\frac{1}{1000-n}$ | Circumference πn | Area $\frac{\pi n^2}{4}$ | n | $\frac{1}{1000-n}$ | Circumference πn | Area $\frac{\pi n^2}{4}$ |
|-----|--------------------|--------------------------|-----------------------------|-----|--------------------|--------------------------|-----------------------------|
| 700 | 1.428 571 | 2199.115 | 384 845.1 | 750 | 1.333 333 | 2356.194 | 441 786.5 |
| 701 | 1.426 534 | 2202.256 | 385 945.4 | 751 | 1.331 558 | 2359.336 | 442 965.3 |
| 702 | 1.424 501 | 2205.398 | 387 047.4 | 752 | 1.329 787 | 2362.478 | 444 145.8 |
| 703 | 1.422 475 | 2208.540 | 388 150.8 | 753 | 1.328 021 | 2365.619 | 445 327.8 |
| 704 | 1.420 455 | 2211.681 | 389 255.9 | 754 | 1.326 260 | 2368.761 | 446 511.4 |
| 705 | 1.418 440 | 2214.823 | 390 362.5 | 755 | 1.324 503 | 2371.902 | 447 696.6 |
| 706 | 1.416 431 | 2217.964 | 391 470.7 | 756 | 1.322 751 | 2375.044 | 448 883.3 |
| 707 | 1.414 427 | 2221.106 | 392 580.5 | 757 | 1.321 004 | 2378.186 | 450 071.6 |
| 708 | 1.412 429 | 2224.248 | 393 691.8 | 758 | 1.319 261 | 2381.327 | 451 261.5 |
| 709 | 1.410 437 | 2227.389 | 394 804.7 | 759 | 1.317 523 | 2384.469 | 452 453.0 |
| 710 | 1.408 451 | 2230.531 | 395 919.2 | 760 | 1.315 789 | 2387.610 | 453 646.0 |
| 711 | 1.406 470 | 2233.672 | 397 035.3 | 761 | 1.314 060 | 2390.752 | 454 840.6 |
| 712 | 1.404 494 | 2236.814 | 398 152.9 | 762 | 1.312 336 | 2393.894 | 456 036.7 |
| 713 | 1.402 525 | 2239.956 | 399 272.1 | 763 | 1.310 616 | 2397.035 | 457 234.5 |
| 714 | 1.400 560 | 2243.097 | 400 392.8 | 764 | 1.308 901 | 2400.177 | 458 433.8 |
| 715 | 1.398 601 | 2246.239 | 401 515.2 | 765 | 1.307 190 | 2403.318 | 459 634.6 |
| 716 | 1.396 648 | 2249.380 | 402 639.1 | 766 | 1.305 483 | 2406.460 | 460 837.1 |
| 717 | 1.394 700 | 2252.522 | 403 764.6 | 767 | 1.303 781 | 2409.602 | 462 041.1 |
| 718 | 1.392 758 | 2255.664 | 404 891.6 | 768 | 1.302 083 | 2412.743 | 463 246.7 |
| 719 | 1.390 821 | 2258.805 | 406 020.2 | 769 | 1.300 390 | 2415.885 | 464 453.8 |
| 720 | 1.388 889 | 2261.947 | 407 150.4 | 770 | 1.298 701 | 2419.026 | 465 662.6 |
| 721 | 1.386 963 | 2265.088 | 408 282.2 | 771 | 1.297 017 | 2422.168 | 466 872.9 |
| 722 | 1.385 042 | 2268.230 | 409 415.5 | 772 | 1.295 337 | 2425.310 | 468 084.7 |
| 723 | 1.383 126 | 2271.371 | 410 550.4 | 773 | 1.293 661 | 2428.451 | 469 298.2 |
| 724 | 1.381 215 | 2274.513 | 411 686.9 | 774 | 1.291 990 | 2431.593 | 470 513.2 |
| 725 | 1.379 310 | 2277.655 | 412 824.9 | 775 | 1.290 323 | 2434.734 | 471 729.8 |
| 726 | 1.377 410 | 2280.796 | 413 964.5 | 776 | 1.288 660 | 2437.876 | 472 947.9 |
| 727 | 1.375 516 | 2283.938 | 415 105.7 | 777 | 1.287 001 | 2441.017 | 474 167.6 |
| 728 | 1.373 626 | 2287.079 | 416 248.5 | 778 | 1.285 347 | 2444.159 | 475 388.9 |
| 729 | 1.371 742 | 2290.221 | 417 392.8 | 779 | 1.283 697 | 2447.301 | 476 611.8 |
| 730 | 1.369 863 | 2293.363 | 418 538.7 | 780 | 1.282 051 | 2450.442 | 477 836.2 |
| 731 | 1.367 989 | 2296.504 | 419 686.1 | 781 | 1.280 410 | 2453.584 | 479 062.2 |
| 732 | 1.366 120 | 2299.646 | 420 835.2 | 782 | 1.278 772 | 2456.725 | 480 289.8 |
| 733 | 1.364 256 | 2302.787 | 421 985.8 | 783 | 1.277 139 | 2459.867 | 481 519.0 |
| 734 | 1.362 398 | 2305.929 | 423 138.0 | 784 | 1.275 510 | 2463.009 | 482 749.7 |
| 735 | 1.360 544 | 2309.071 | 424 291.7 | 785 | 1.273 885 | 2466.150 | 483 982.0 |
| 736 | 1.358 696 | 2312.212 | 425 447.0 | 786 | 1.272 265 | 2469.292 | 485 215.8 |
| 737 | 1.356 852 | 2315.354 | 426 603.9 | 787 | 1.270 648 | 2472.433 | 486 451.3 |
| 738 | 1.355 014 | 2318.495 | 427 762.4 | 788 | 1.269 036 | 2475.575 | 487 688.3 |
| 739 | 1.353 180 | 2321.637 | 428 922.4 | 789 | 1.267 427 | 2478.717 | 488 926.9 |
| 740 | 1.351 351 | 2324.779 | 430 084.0 | 790 | 1.265 823 | 2481.858 | 490 167.0 |
| 741 | 1.349 528 | 2327.920 | 431 247.2 | 791 | 1.264 223 | 2485.000 | 491 408.7 |
| 742 | 1.347 709 | 2331.062 | 432 412.0 | 792 | 1.262 626 | 2488.141 | 492 652.0 |
| 743 | 1.345 895 | 2334.203 | 433 578.3 | 793 | 1.261 034 | 2491.283 | 493 896.8 |
| 744 | 1.344 086 | 2337.345 | 434 746.2 | 794 | 1.259 446 | 2494.425 | 495 143.3 |
| 745 | 1.342 282 | 2340.487 | 435 915.6 | 795 | 1.257 862 | 2497.566 | 496 391.3 |
| 746 | 1.340 483 | 2343.628 | 437 086.6 | 796 | 1.256 281 | 2500.708 | 497 640.8 |
| 747 | 1.338 688 | 2346.770 | 438 259.2 | 797 | 1.254 705 | 2503.849 | 498 892.0 |
| 748 | 1.336 898 | 2349.911 | 439 433.4 | 798 | 1.253 133 | 2506.991 | 500 144.7 |
| 749 | 1.335 113 | 2353.053 | 440 609.2 | 799 | 1.251 564 | 2510.133 | 501 399.0 |
| 750 | 1.333 333 | 2356.194 | 441 786.5 | 800 | 1.250 000 | 2513.274 | 502 654.8 |

RECIPROCAL, CIRCUMFERENCE AND AREA OF CIRCLES (Continued)

| n | $\frac{1}{1000-n}$ | Circumference πn | Area $\frac{\pi n^2}{4}$ | n | $\frac{1}{1000-n}$ | Circumference πn | Area $\frac{\pi n^2}{4}$ |
|-----|--------------------|--------------------------|-----------------------------|-----|--------------------|--------------------------|-----------------------------|
| 800 | 1.250 000 | 2513.274 | 502 654.8 | 850 | 1.176 471 | 2670.354 | 567 450.2 |
| 801 | 1.248 439 | 2516.416 | 503 912.2 | 851 | 1.175 088 | 2673.495 | 568 786.1 |
| 802 | 1.246 883 | 2519.557 | 505 171.2 | 852 | 1.173 709 | 2676.637 | 570 123.7 |
| 803 | 1.245 330 | 2522.699 | 506 431.8 | 853 | 1.172 333 | 2679.779 | 571 462.8 |
| 804 | 1.243 781 | 2525.840 | 507 693.9 | 854 | 1.170 960 | 2682.920 | 572 803.4 |
| 805 | 1.242 236 | 2528.982 | 508 957.6 | 855 | 1.169 591 | 2686.062 | 574 145.7 |
| 806 | 1.240 695 | 2532.124 | 510 222.9 | 856 | 1.168 224 | 2689.203 | 575 489.5 |
| 807 | 1.239 157 | 2535.265 | 511 489.8 | 857 | 1.166 861 | 2692.345 | 576 834.9 |
| 808 | 1.237 624 | 2538.407 | 512 758.2 | 858 | 1.165 501 | 2695.486 | 578 181.9 |
| 809 | 1.236 094 | 2541.548 | 514 028.2 | 859 | 1.164 144 | 2698.628 | 579 530.4 |
| 810 | 1.234 568 | 2544.690 | 515 299.7 | 860 | 1.162 791 | 2701.770 | 580 880.5 |
| 811 | 1.233 046 | 2547.832 | 516 572.9 | 861 | 1.161 440 | 2704.911 | 582 232.2 |
| 812 | 1.231 527 | 2550.973 | 517 847.6 | 862 | 1.160 093 | 2708.053 | 583 585.4 |
| 813 | 1.230 012 | 2554.115 | 519 123.8 | 863 | 1.158 749 | 2711.194 | 584 940.2 |
| 814 | 1.228 501 | 2557.256 | 520 401.7 | 864 | 1.157 407 | 2714.336 | 586 296.6 |
| 815 | 1.226 994 | 2560.398 | 521 681.1 | 865 | 1.156 069 | 2717.478 | 587 654.5 |
| 816 | 1.225 490 | 2563.540 | 522 962.1 | 866 | 1.154 734 | 2720.619 | 589 014.1 |
| 817 | 1.223 990 | 2566.681 | 524 244.6 | 867 | 1.153 403 | 2723.761 | 590 375.2 |
| 818 | 1.222 494 | 2569.823 | 525 528.8 | 868 | 1.152 074 | 2726.902 | 591 737.8 |
| 819 | 1.221 001 | 2572.964 | 526 814.5 | 869 | 1.150 748 | 2730.044 | 593 102.1 |
| 820 | 1.219 512 | 2576.106 | 528 101.7 | 870 | 1.149 425 | 2733.186 | 594 467.9 |
| 821 | 1.218 027 | 2579.248 | 529 390.6 | 871 | 1.148 106 | 2736.327 | 595 835.2 |
| 822 | 1.216 545 | 2582.389 | 530 681.0 | 872 | 1.146 789 | 2739.469 | 597 204.2 |
| 823 | 1.215 067 | 2585.531 | 531 973.0 | 873 | 1.145 475 | 2742.610 | 598 574.7 |
| 824 | 1.213 592 | 2588.672 | 533 266.5 | 874 | 1.144 165 | 2745.752 | 599 946.8 |
| 825 | 1.212 121 | 2591.814 | 534 561.6 | 875 | 1.142 857 | 2748.894 | 601 320.5 |
| 826 | 1.210 654 | 2594.956 | 535 858.3 | 876 | 1.141 553 | 2752.035 | 602 695.7 |
| 827 | 1.209 190 | 2598.097 | 537 156.6 | 877 | 1.140 251 | 2755.177 | 604 072.2 |
| 828 | 1.207 729 | 2601.239 | 538 456.4 | 878 | 1.138 952 | 2758.318 | 605 450.9 |
| 829 | 1.206 273 | 2604.380 | 539 757.8 | 879 | 1.137 656 | 2761.460 | 606 830.8 |
| 830 | 1.204 819 | 2607.522 | 541.060.8 | 880 | 1.136 364 | 2764.602 | 608 212.3 |
| 831 | 1.203 369 | 2610.663 | 542 365.3 | 881 | 1.135 074 | 2767.743 | 609 595.4 |
| 832 | 1.201 923 | 2613.805 | 543 671.5 | 882 | 1.133 787 | 2770.885 | 610 980.1 |
| 833 | 1.200 480 | 2616.947 | 544 979.1 | 883 | 1.132 503 | 2774.026 | 612 366.3 |
| 834 | 1.199 041 | 2620.088 | 546 288.4 | 884 | 1.131 222 | 2777.168 | 613 754.1 |
| 835 | 1.197 605 | 2623.230 | 547 599.2 | 885 | 1.129 944 | 2780.309 | 615 143.5 |
| 836 | 1.196 172 | 2626.371 | 548 911.6 | 886 | 1.128 668 | 2783.451 | 616 534.4 |
| 837 | 1.194 743 | 2629.513 | 550 225.6 | 887 | 1.127 396 | 2786.593 | 617 926.9 |
| 838 | 1.193 317 | 2632.655 | 551 541.1 | 888 | 1.126 126 | 2789.734 | 619 321.0 |
| 839 | 1.191 895 | 2635.796 | 552 858.3 | 889 | 1.124 859 | 2792.876 | 620 716.7 |
| 840 | 1.190 476 | 2638.938 | 554 176.9 | 890 | 1.123 596 | 2796.017 | 622 113.9 |
| 841 | 1.189 061 | 2642.079 | 555 497.2 | 891 | 1.122 334 | 2799.159 | 623 512.7 |
| 842 | 1.187 648 | 2645.221 | 556 819.0 | 892 | 1.121 076 | 2802.301 | 624 913.0 |
| 843 | 1.186 240 | 2648.363 | 558 142.4 | 893 | 1.119 821 | 2805.442 | 626 315.0 |
| 844 | 1.184 834 | 2651.504 | 559 467.4 | 894 | 1.118 568 | 2808.584 | 627 718.5 |
| 845 | 1.183 432 | 2654.646 | 560 793.9 | 895 | 1.117 318 | 2811.725 | 629 123.6 |
| 846 | 1.182 033 | 2657.787 | 562 122.0 | 896 | 1.116 071 | 2814.867 | 630 530.2 |
| 847 | 1.180 638 | 2660.929 | 563 451.7 | 897 | 1.114 827 | 2818.009 | 631 938.4 |
| 848 | 1.179 245 | 2664.071 | 564 783.0 | 898 | 1.113 586 | 2821.150 | 633 348.2 |
| 849 | 1.177 856 | 2667.212 | 566 115.8 | 899 | 1.112 347 | 2824.292 | 634 759.6 |
| 850 | 1.176 471 | 2670.354 | 567 450.2 | 900 | 1.111 111 | 2827.433 | 636 172.5 |

RECIPROCAL, CIRCUMFERENCE AND AREA OF CIRCLES (Continued)

| n | $\frac{1}{1000-n}$ | Circumference πn | Area $\frac{\pi n^2}{4}$ | n | $\frac{1}{1000-n}$ | Circumference πn | Area $\frac{\pi n^2}{4}$ |
|-----|--------------------|--------------------------|-----------------------------|------|--------------------|--------------------------|-----------------------------|
| 900 | 1.111 111 | 2827.433 | 636 172.5 | 950 | 1.052 632 | 2984.513 | 708 821.8 |
| 901 | 1.109 878 | 2830.575 | 637 587.0 | 951 | 1.051 525 | 2987.655 | 710 314.9 |
| 902 | 1.108 647 | 2833.717 | 639 003.1 | 952 | 1.050 420 | 2990.796 | 711 809.5 |
| 903 | 1.107 420 | 2836.858 | 640 420.7 | 953 | 1.049 318 | 2993.938 | 713 305.7 |
| 904 | 1.106 195 | 2840.000 | 641 839.9 | 954 | 1.048 218 | 2997.079 | 714 803.4 |
| 905 | 1.104 972 | 2843.141 | 643 260.7 | 955 | 1.047 120 | 3000.221 | 716 302.8 |
| 906 | 1.103 753 | 2846.283 | 644 683.1 | 956 | 1.046 025 | 3003.363 | 717 803.7 |
| 907 | 1.102 536 | 2849.425 | 646 107.0 | 957 | 1.044 932 | 3006.504 | 719 306.1 |
| 908 | 1.101 322 | 2852.566 | 647 532.5 | 958 | 1.043 841 | 3009.646 | 720 810.2 |
| 909 | 1.100 110 | 2855.708 | 648 959.6 | 959 | 1.042 753 | 3012.787 | 722 315.8 |
| 910 | 1.098 901 | 2858.849 | 650 388.2 | 960 | 1.041 667 | 3015.929 | 723 822.9 |
| 911 | 1.097 695 | 2861.991 | 651 818.4 | 961 | 1.040 583 | 3019.071 | 725 331.7 |
| 912 | 1.096 491 | 2865.133 | 653 250.2 | 962 | 1.039 501 | 3022.212 | 726 842.0 |
| 913 | 1.095 290 | 2868.274 | 654 683.6 | 963 | 1.038 422 | 3025.354 | 728 353.9 |
| 914 | 1.094 092 | 2871.416 | 656 118.5 | 964 | 1.037 344 | 3028.495 | 729 867.4 |
| 915 | 1.092 896 | 2874.557 | 657 555.0 | 965 | 1.036 269 | 3031.637 | 731 382.4 |
| 916 | 1.091 703 | 2877.699 | 658 993.0 | 966 | 1.035 197 | 3034.779 | 732 899.0 |
| 917 | 1.090 513 | 2880.840 | 660 432.7 | 967 | 1.034 126 | 3037.920 | 734 417.2 |
| 918 | 1.089 325 | 2883.982 | 661 873.9 | 968 | 1.033 058 | 3041.062 | 735 936.9 |
| 919 | 1.088 139 | 2887.124 | 663 316.7 | 969 | 1.031 992 | 3044.203 | 737 458.2 |
| 920 | 1.086 957 | 2890.265 | 664 761.0 | 970 | 1.030 928 | 3047.345 | 738 981.1 |
| 921 | 1.085 776 | 2893.407 | 666 206.9 | 971 | 1.029 866 | 3050.486 | 740 505.6 |
| 922 | 1.084 599 | 2896.548 | 667 654.4 | 972 | 1.028 807 | 3053.628 | 742 031.6 |
| 923 | 1.083 424 | 2899.690 | 669 103.5 | 973 | 1.027 749 | 3056.770 | 743 559.2 |
| 924 | 1.082 251 | 2902.832 | 670 554.1 | 974 | 1.026 694 | 3059.911 | 745 088.4 |
| 925 | 1.081 081 | 2905.973 | 672 006.3 | 975 | 1.025 641 | 3063.053 | 746 619.1 |
| 926 | 1.079 914 | 2909.115 | 673 460.1 | 976 | 1.024 590 | 3066.194 | 748 151.4 |
| 927 | 1.078 749 | 2912.256 | 674 915.4 | 977 | 1.023 541 | 3069.336 | 749 685.3 |
| 928 | 1.077 586 | 2915.398 | 676 372.3 | 978 | 1.022 495 | 3072.478 | 751 220.8 |
| 929 | 1.076 426 | 2918.540 | 677 830.8 | 979 | 1.021 450 | 3075.619 | 752 757.8 |
| 930 | 1.075 269 | 2921.681 | 679 290.9 | 980 | 1.020 408 | 3078.761 | 754 296.4 |
| 931 | 1.074 114 | 2924.823 | 680 752.5 | 981 | 1.019 368 | 3081.902 | 755 836.6 |
| 932 | 1.072 961 | 2927.964 | 682 215.7 | 982 | 1.018 330 | 3085.044 | 757 378.3 |
| 933 | 1.071 811 | 2931.106 | 683 680.5 | 983 | 1.017 294 | 3088.186 | 758 921.6 |
| 934 | 1.070 664 | 2934.248 | 685 146.8 | 984 | 1.016 260 | 3091.327 | 760 466.5 |
| 935 | 1.069 519 | 2937.389 | 686 614.7 | 985 | 1.015 228 | 3094.469 | 762 012.9 |
| 936 | 1.068 376 | 2940.531 | 688 084.2 | 986 | 1.014 199 | 3097.610 | 763 561.0 |
| 937 | 1.067 236 | 2943.672 | 689 555.2 | 987 | 1.013 171 | 3100.752 | 765 110.5 |
| 938 | 1.066 098 | 2946.814 | 691 027.9 | 988 | 1.012 146 | 3103.894 | 766 661.7 |
| 939 | 1.064 963 | 2949.956 | 692 502.1 | 989 | 1.011 122 | 3107.035 | 768 214.4 |
| 940 | 1.063 830 | 2953.097 | 693 977.8 | 990 | 1.010 101 | 3110.177 | 769 768.7 |
| 941 | 1.062 699 | 2956.239 | 695 455.2 | 991 | 1.009 082 | 3113.318 | 771 324.6 |
| 942 | 1.061 571 | 2959.380 | 696 934.1 | 992 | 1.008 065 | 3116.460 | 772 882.1 |
| 943 | 1.060 445 | 2962.522 | 698 414.5 | 993 | 1.007 049 | 3119.602 | 774 441.1 |
| 944 | 1.059 322 | 2965.663 | 699 896.6 | 994 | 1.006 036 | 3122.743 | 776 001.7 |
| 945 | 1.058 201 | 2968.805 | 701 380.2 | 995 | 1.005 025 | 3125.885 | 777 563.8 |
| 946 | 1.057 082 | 2971.947 | 702 865.4 | 996 | 1.004 016 | 3129.026 | 779 127.5 |
| 947 | 1.055 966 | 2975.088 | 704 352.1 | 997 | 1.003 009 | 3132.168 | 780 692.8 |
| 948 | 1.054 852 | 2978.230 | 705 840.5 | 998 | 1.002 004 | 3135.309 | 782 259.7 |
| 949 | 1.053 741 | 2981.371 | 707 330.4 | 999 | 1.001 001 | 3138.451 | 783 828.2 |
| 950 | 1.052 632 | 2984.513 | 708 821.8 | 1000 | 1.000 000 | 3141.593 | 785 398.2 |

SQUARES, CUBES AND ROOTS

Squares, Cubes and Roots

Roots of numbers other than those given directly may be found by the following relations:

$$\begin{aligned} \sqrt{100n} &= 10 \sqrt{n}; & \sqrt{1000n} &= 10 \sqrt{10n}; & \sqrt{\frac{1}{10}n} &= \frac{1}{10} \sqrt{10n}; & \sqrt{\frac{1}{100}n} &= \frac{1}{10} \sqrt{n}, \\ \sqrt{\frac{1}{1000}n} &= \frac{1}{100} \sqrt{10n}; & \sqrt[3]{1000n} &= 10 \sqrt[3]{n}; & \sqrt[3]{10,000n} &= 10 \sqrt[3]{10n}; & \sqrt[3]{100,000n} &= \\ 10 \sqrt[3]{100n}; & \sqrt[3]{\frac{1}{10}n} &= \frac{1}{10} \sqrt[3]{100n}; & \sqrt[3]{\frac{1}{100}n} &= \frac{1}{10} \sqrt[3]{10n}; & \sqrt[3]{\frac{1}{1000}n} &= \frac{1}{10} \sqrt[3]{n}. \end{aligned}$$

| n | n^2 | \sqrt{n} | $\sqrt{10n}$ | n^3 | $\sqrt[3]{n}$ | $\sqrt[3]{10n}$ | $\sqrt[3]{100n}$ |
|-----|-------|------------|--------------|---------|---------------|-----------------|------------------|
| 1 | 1 | 1.000 000 | 3.162 278 | 1 | 1.000 000 | 2.154 435 | 4.641 589 |
| 2 | 4 | 1.414 214 | 4.472 136 | 8 | 1.259 921 | 2.714 418 | 5.848 035 |
| 3 | 9 | 1.732 051 | 5.477 226 | 27 | 1.442 250 | 3.107 233 | 6.694 330 |
| 4 | 16 | 2.000 000 | 6.324 555 | 64 | 1.587 401 | 3.419 952 | 7.368 063 |
| 5 | 25 | 2.236 068 | 7.071 068 | 125 | 1.709 976 | 3.684 031 | 7.937 005 |
| 6 | 36 | 2.449 490 | 7.745 967 | 216 | 1.817 121 | 3.914 868 | 8.434 327 |
| 7 | 49 | 2.645 751 | 8.366 600 | 343 | 1.912 931 | 4.121 285 | 8.879 040 |
| 8 | 64 | 2.828 427 | 8.944 272 | 512 | 2.000 000 | 4.308 869 | 9.283 178 |
| 9 | 81 | 3.000 000 | 9.486 833 | 729 | 2.080 084 | 4.481 405 | 9.654 894 |
| 10 | 100 | 3.162 278 | 10.00000 | 1 000 | 2.154 435 | 4.641 589 | 10.00000 |
| 11 | 121 | 3.316 625 | 10.48809 | 1 331 | 2.223 980 | 4.791 420 | 10.32280 |
| 12 | 144 | 3.464 102 | 10.95445 | 1 728 | 2.289 428 | 4.932 424 | 10.62659 |
| 13 | 169 | 3.605 551 | 11.40175 | 2 197 | 2.351 335 | 5.065 797 | 10.91393 |
| 14 | 196 | 3.741 657 | 11.83216 | 2 744 | 2.410 142 | 5.192 494 | 11.18689 |
| 15 | 225 | 3.872 983 | 12.24745 | 3 375 | 2.466 212 | 5.313 293 | 11.44714 |
| 16 | 256 | 4.000 000 | 12.64911 | 4 096 | 2.519 842 | 5.428 835 | 11.69607 |
| 17 | 289 | 4.123 106 | 13.03840 | 4 913 | 2.571 282 | 5.539 658 | 11.93483 |
| 18 | 324 | 4.242 641 | 13.41641 | 5 832 | 2.620 741 | 5.646 216 | 12.16440 |
| 19 | 361 | 4.358 899 | 13.78405 | 6 859 | 2.668 402 | 5.748 897 | 12.38562 |
| 20 | 400 | 4.472 136 | 14.14214 | 8 000 | 2.714 418 | 5.848 035 | 12.59921 |
| 21 | 441 | 4.582 576 | 14.49138 | 9 261 | 2.758 924 | 5.943 922 | 12.80579 |
| 22 | 484 | 4.690 416 | 14.83240 | 10 648 | 2.802 039 | 6.036 811 | 13.00591 |
| 23 | 529 | 4.795 832 | 15.16575 | 12 167 | 2.843 867 | 6.126 926 | 13.20006 |
| 24 | 576 | 4.898 979 | 15.49193 | 13 824 | 2.884 499 | 6.214 465 | 13.38866 |
| 25 | 625 | 5.000 000 | 15.81139 | 15 625 | 2.924 018 | 6.299 605 | 13.57209 |
| 26 | 676 | 5.099 020 | 16.12452 | 17 576 | 2.962 496 | 6.382 504 | 13.75069 |
| 27 | 729 | 5.196 152 | 16.43168 | 19 683 | 3.000 000 | 6.463 304 | 13.92477 |
| 28 | 784 | 5.291 503 | 16.73320 | 21 952 | 3.036 589 | 6.542 133 | 14.09460 |
| 29 | 841 | 5.385 165 | 17.02939 | 24 389 | 3.072 317 | 6.619 106 | 14.26043 |
| 30 | 900 | 5.477 226 | 17.32051 | 27 000 | 3.107 233 | 6.694 330 | 14.42250 |
| 31 | 961 | 5.567 764 | 17.60682 | 29 791 | 3.141 381 | 6.767 899 | 14.58100 |
| 32 | 1 024 | 5.656 854 | 17.88854 | 32 768 | 3.174 802 | 6.839 904 | 14.73613 |
| 33 | 1 089 | 5.744 563 | 18.16590 | 35 937 | 3.207 534 | 6.910 423 | 14.88806 |
| 34 | 1 156 | 5.830 952 | 18.43909 | 39 304 | 3.239 612 | 6.979 532 | 15.03695 |
| 35 | 1 225 | 5.916 080 | 18.70829 | 42 875 | 3.271 066 | 7.047 299 | 15.18294 |
| 36 | 1 296 | 6.000 000 | 18.97367 | 46 656 | 3.301 927 | 7.113 787 | 15.32619 |
| 37 | 1 369 | 6.082 763 | 19.23538 | 50 653 | 3.332 222 | 7.179 054 | 15.46680 |
| 38 | 1 444 | 6.164 414 | 19.49359 | 54 872 | 3.361 975 | 7.243 156 | 15.60491 |
| 39 | 1 521 | 6.244 998 | 19.74842 | 59 319 | 3.391 211 | 7.306 144 | 15.74061 |
| 40 | 1 600 | 6.324 555 | 20.00000 | 64 000 | 3.419 952 | 7.368 063 | 15.87401 |
| 41 | 1 681 | 6.403 124 | 20.24846 | 68 921 | 3.448 217 | 7.428 959 | 16.00521 |
| 42 | 1 764 | 6.480 741 | 20.49390 | 74 088 | 3.476 027 | 7.488 872 | 16.13429 |
| 43 | 1 849 | 6.557 439 | 20.73644 | 79 507 | 3.503 398 | 7.547 842 | 16.26133 |
| 44 | 1 936 | 6.633 250 | 20.97618 | 85 184 | 3.530 348 | 7.605 905 | 16.38643 |
| 45 | 2 025 | 6.708 204 | 21.21320 | 91 125 | 3.556 893 | 7.663 094 | 16.50964 |
| 46 | 2 116 | 6.782 330 | 21.44761 | 97 336 | 3.583 048 | 7.719 443 | 16.63103 |
| 47 | 2 209 | 6.855 655 | 21.67948 | 103 823 | 3.608 826 | 7.774 980 | 16.75069 |
| 48 | 2 304 | 6.928 203 | 21.90890 | 110 592 | 3.634 241 | 7.829 735 | 16.86865 |
| 49 | 2 401 | 7.000 000 | 22.13594 | 117 649 | 3.659 306 | 7.883 735 | 16.98499 |
| 50 | 2 500 | 7.071 068 | 22.36068 | 125 000 | 3.684 031 | 7.937 005 | 17.09976 |

SQUARES, CUBES AND ROOTS (Continued)

| n | n^2 | \sqrt{n} | $\sqrt{10n}$ | n^3 | $\sqrt[3]{n}$ | $\sqrt[3]{10n}$ | $\sqrt[3]{100n}$ |
|-----|--------|------------|--------------|-----------|---------------|-----------------|------------------|
| 50 | 2 500 | 7.071 068 | 22.36068 | 125 000 | 3.684 031 | 7.937 005 | 17.09978 |
| 51 | 2 601 | 7.141 428 | 22.58318 | 132 651 | 3.708 430 | 7.989 570 | 17.21301 |
| 52 | 2 704 | 7.211 103 | 22.80351 | 140 608 | 3.732 511 | 8.041 452 | 17.32478 |
| 53 | 2 809 | 7.280 110 | 23.02173 | 148 877 | 3.756 286 | 8.092 672 | 17.43513 |
| 54 | 2 916 | 7.348 469 | 23.23790 | 157 464 | 3.779 763 | 8.143 253 | 17.54411 |
| 55 | 3 025 | 7.416 198 | 23.45208 | 166 375 | 3.802 952 | 8.193 213 | 17.65174 |
| 56 | 3 136 | 7.483 315 | 23.66432 | 175 616 | 3.825 862 | 8.242 571 | 17.75808 |
| 57 | 3 249 | 7.549 834 | 23.87467 | 185 193 | 3.848 501 | 8.291 344 | 17.86316 |
| 58 | 3 364 | 7.615 773 | 24.08319 | 195 112 | 3.870 877 | 8.339 551 | 17.96702 |
| 59 | 3 481 | 7.681 146 | 24.28992 | 205 379 | 3.892 996 | 8.387 207 | 18.06969 |
| 60 | 3 600 | 7.745 967 | 24.49490 | 216 000 | 3.914 868 | 8.434 327 | 18.17121 |
| 61 | 3 721 | 7.810 250 | 24.69818 | 226 981 | 3.936 497 | 8.480 926 | 18.27160 |
| 62 | 3 844 | 7.874 008 | 24.89980 | 238 328 | 3.957 892 | 8.527 019 | 18.37091 |
| 63 | 3 969 | 7.937 254 | 25.09980 | 250 047 | 3.979 057 | 8.572 619 | 18.46915 |
| 64 | 4 096 | 8.000 000 | 25.29822 | 262 144 | 4.000 000 | 8.617 739 | 18.56636 |
| 65 | 4 225 | 8.062 258 | 25.49510 | 274 625 | 4.020 726 | 8.662 391 | 18.66256 |
| 66 | 4 356 | 8.124 038 | 25.69047 | 287 496 | 4.041 240 | 8.706 588 | 18.75777 |
| 67 | 4 489 | 8.185 353 | 25.88436 | 300 763 | 4.061 548 | 8.750 340 | 18.85204 |
| 68 | 4 624 | 8.246 211 | 26.07681 | 314 432 | 4.081 655 | 8.793 659 | 18.94536 |
| 69 | 4 761 | 8.306 624 | 26.26785 | 328 509 | 4.101 566 | 8.836 556 | 19.03778 |
| 70 | 4 900 | 8.366 600 | 26.45751 | 343 000 | 4.121 285 | 8.879 040 | 19.12931 |
| 71 | 5 041 | 8.426 150 | 26.64583 | 357 911 | 4.140 818 | 8.921 121 | 19.21997 |
| 72 | 5 184 | 8.485 281 | 26.83282 | 373 248 | 4.160 168 | 8.962 809 | 19.30979 |
| 73 | 5 329 | 8.544 004 | 27.01851 | 389 017 | 4.179 339 | 9.004 113 | 19.39877 |
| 74 | 5 476 | 8.602 325 | 27.20294 | 405 224 | 4.198 336 | 9.045 042 | 19.48695 |
| 75 | 5 625 | 8.660 254 | 27.38613 | 421 875 | 4.217 163 | 9.085 603 | 19.57434 |
| 76 | 5 776 | 8.717 798 | 27.56810 | 438 976 | 4.235 824 | 9.125 805 | 19.66095 |
| 77 | 5 929 | 8.774 964 | 27.74887 | 456 533 | 4.254 321 | 9.165 656 | 19.74681 |
| 78 | 6 084 | 8.831 761 | 27.92848 | 474 552 | 4.272 659 | 9.205 164 | 19.83192 |
| 79 | 6 241 | 8.888 194 | 28.10594 | 493 039 | 4.290 840 | 9.244 335 | 19.91632 |
| 80 | 6 400 | 8.944 272 | 28.28427 | 512 000 | 4.308 869 | 9.283 178 | 20.00000 |
| 81 | 6 561 | 9.000 000 | 28.46050 | 531 441 | 4.326 749 | 9.321 698 | 20.08299 |
| 82 | 6 724 | 9.055 385 | 28.63564 | 551 368 | 4.344 481 | 9.359 902 | 20.16530 |
| 83 | 6 889 | 9.110 434 | 28.80972 | 571 787 | 4.362 071 | 9.397 796 | 20.24694 |
| 84 | 7 056 | 9.165 151 | 28.98275 | 592 704 | 4.379 519 | 9.435 388 | 20.32793 |
| 85 | 7 225 | 9.219 544 | 29.15476 | 614 125 | 4.396 830 | 9.472 682 | 20.40828 |
| 86 | 7 396 | 9.273 618 | 29.32576 | 636 056 | 4.414 005 | 9.509 685 | 20.48800 |
| 87 | 7 569 | 9.327 379 | 29.49576 | 658 503 | 4.431 048 | 9.546 403 | 20.56710 |
| 88 | 7 744 | 9.380 832 | 29.66479 | 681 472 | 4.447 960 | 9.582 840 | 20.64560 |
| 89 | 7 921 | 9.433 981 | 29.83287 | 704 969 | 4.464 745 | 9.619 002 | 20.72351 |
| 90 | 8 100 | 9.486 833 | 30.00000 | 729 000 | 4.481 405 | 9.654 894 | 20.80084 |
| 91 | 8 281 | 9.539 392 | 30.16621 | 753 571 | 4.497 941 | 9.690 521 | 20.87759 |
| 92 | 8 464 | 9.591 663 | 30.33150 | 778 688 | 4.514 357 | 9.725 888 | 20.95379 |
| 93 | 8 649 | 9.643 651 | 30.49590 | 804 357 | 4.530 655 | 9.761 000 | 21.02944 |
| 94 | 8 836 | 9.695 360 | 30.65942 | 830 584 | 4.546 836 | 9.795 861 | 21.10454 |
| 95 | 9 025 | 9.746 794 | 30.82207 | 857 375 | 4.562 903 | 9.830 476 | 21.17912 |
| 96 | 9 216 | 9.797 959 | 30.98387 | 884 736 | 4.578 857 | 9.864 848 | 21.25317 |
| 97 | 9 409 | 9.848 858 | 31.14482 | 912 673 | 4.594 701 | 9.898 983 | 21.32671 |
| 98 | 9 604 | 9.899 495 | 31.30495 | 941 192 | 4.610 436 | 9.932 884 | 21.39975 |
| 99 | 9 801 | 9.949 874 | 31.46427 | 970 299 | 4.626 065 | 9.966 555 | 21.47229 |
| 100 | 10 000 | 10.00000 | 31.62278 | 1 000 000 | 4.641 589 | 10.00000 | 21.54435 |

SQUARES, CUBES AND ROOTS (Continued)

| n | n^2 | \sqrt{n} | $\sqrt{10n}$ | n^3 | $\sqrt[3]{n}$ | $\sqrt[3]{10n}$ | $\sqrt[3]{100n}$ |
|-----|--------|------------|--------------|-----------|---------------|-----------------|------------------|
| 100 | 10 000 | 10.00000 | 31.62278 | 1 000 000 | 4.641 589 | 10.00000 | 21.54435 |
| 101 | 10 201 | 10.04988 | 31.78050 | 1 030 301 | 4.657 010 | 10.03322 | 21.61592 |
| 102 | 10 404 | 10.09950 | 31.93744 | 1 061 208 | 4.672 329 | 10.06623 | 21.68703 |
| 103 | 10 609 | 10.14889 | 32.09361 | 1 092 727 | 4.687 543 | 10.09902 | 21.75766 |
| 104 | 10 816 | 10.19804 | 32.24903 | 1 124 864 | 4.702 669 | 10.13159 | 21.82786 |
| 105 | 11 025 | 10.24695 | 32.40370 | 1 157 625 | 4.717 694 | 10.16396 | 21.89760 |
| 106 | 11 236 | 10.29563 | 32.55764 | 1 191 016 | 4.732 623 | 10.19613 | 21.96689 |
| 107 | 11 449 | 10.34408 | 32.71085 | 1 225 043 | 4.747 459 | 10.22809 | 22.03575 |
| 108 | 11 664 | 10.39230 | 32.86335 | 1 259 712 | 4.762 203 | 10.25986 | 22.10419 |
| 109 | 11 881 | 10.44031 | 33.01515 | 1 295 029 | 4.776 856 | 10.29142 | 22.17220 |
| 110 | 12 100 | 10.48809 | 33.16625 | 1 331 000 | 4.791 420 | 10.32280 | 22.23980 |
| 111 | 12 321 | 10.53565 | 33.31666 | 1 367 631 | 4.805 896 | 10.35399 | 22.30699 |
| 112 | 12 544 | 10.58301 | 33.46640 | 1 404 928 | 4.820 285 | 10.38499 | 22.37378 |
| 113 | 12 769 | 10.63015 | 33.61547 | 1 442 897 | 4.834 588 | 10.41580 | 22.44017 |
| 114 | 12 996 | 10.67708 | 33.76389 | 1 481 544 | 4.848 808 | 10.44644 | 22.50617 |
| 115 | 13 225 | 10.72381 | 33.91165 | 1 520 875 | 4.862 944 | 10.47690 | 22.57179 |
| 116 | 13 456 | 10.77033 | 34.05877 | 1 560 896 | 4.876 999 | 10.50718 | 22.63702 |
| 117 | 13 689 | 10.81665 | 34.20526 | 1 601 613 | 4.890 973 | 10.53728 | 22.70189 |
| 118 | 13 924 | 10.86278 | 34.35113 | 1 643 032 | 4.904 868 | 10.56722 | 22.76638 |
| 119 | 14 161 | 10.90871 | 34.49638 | 1 685 159 | 4.918 685 | 10.59699 | 22.83051 |
| 120 | 14 400 | 10.95445 | 34.64102 | 1 728 000 | 4.932 424 | 10.62659 | 22.89428 |
| 121 | 14 641 | 11.00000 | 34.78505 | 1 771 561 | 4.946 087 | 10.65602 | 22.95770 |
| 122 | 14 884 | 11.04536 | 34.92850 | 1 815 848 | 4.959 676 | 10.68530 | 23.02078 |
| 123 | 15 129 | 11.09054 | 35.07136 | 1 860 867 | 4.973 190 | 10.71441 | 23.08350 |
| 124 | 15 376 | 11.13553 | 35.21363 | 1 906 624 | 4.986 631 | 10.74337 | 23.14589 |
| 125 | 15 625 | 11.18034 | 35.35534 | 1 953 125 | 5.000 000 | 10.77217 | 23.20794 |
| 126 | 15 876 | 11.22497 | 35.49648 | 2 000 376 | 5.013 298 | 10.80082 | 23.26967 |
| 127 | 16 129 | 11.26943 | 35.63706 | 2 048 383 | 5.026 526 | 10.82932 | 23.33107 |
| 128 | 16 384 | 11.31371 | 35.77709 | 2 097 152 | 5.039 684 | 10.85767 | 23.39214 |
| 129 | 16 641 | 11.35782 | 35.91657 | 2 146 689 | 5.052 774 | 10.88587 | 23.45290 |
| 130 | 16 900 | 11.40175 | 36.05551 | 2 197 000 | 5.065 797 | 10.91393 | 23.51335 |
| 131 | 17 161 | 11.44552 | 36.19392 | 2 248 091 | 5.078 753 | 10.94184 | 23.57348 |
| 132 | 17 424 | 11.48913 | 36.33180 | 2 299 968 | 5.091 643 | 10.96961 | 23.63332 |
| 133 | 17 689 | 11.53256 | 36.46917 | 2 352 637 | 5.104 469 | 10.99724 | 23.69285 |
| 134 | 17 956 | 11.57584 | 36.60601 | 2 406 104 | 5.117 230 | 11.02474 | 23.75208 |
| 135 | 18 225 | 11.61895 | 36.74235 | 2 460 375 | 5.129 928 | 11.05209 | 23.81102 |
| 136 | 18 496 | 11.66190 | 36.87818 | 2 515 456 | 5.142 563 | 11.07932 | 23.86966 |
| 137 | 18 769 | 11.70470 | 37.01351 | 2 571 353 | 5.155 137 | 11.10641 | 23.92800 |
| 138 | 19 044 | 11.74734 | 37.14835 | 2 628 072 | 5.167 649 | 11.13336 | 23.98610 |
| 139 | 19 321 | 11.78983 | 37.28270 | 2 685 619 | 5.180 101 | 11.16019 | 24.04390 |
| 140 | 19 600 | 11.83216 | 37.41657 | 2 744 000 | 5.192 494 | 11.18689 | 24.10142 |
| 141 | 19 881 | 11.87434 | 37.54997 | 2 803 221 | 5.204 828 | 11.21346 | 24.15867 |
| 142 | 20 164 | 11.91638 | 37.68289 | 2 863 288 | 5.217 103 | 11.23991 | 24.21565 |
| 143 | 20 449 | 11.95826 | 37.81534 | 2 924 207 | 5.229 322 | 11.26623 | 24.27236 |
| 144 | 20 736 | 12.00000 | 37.94733 | 2 985 984 | 5.241 483 | 11.29243 | 24.32881 |
| 145 | 21 025 | 12.04159 | 38.07887 | 3 048 625 | 5.253 588 | 11.31851 | 24.38499 |
| 146 | 21 316 | 12.08305 | 38.20995 | 3 112 136 | 5.265 637 | 11.34447 | 24.44092 |
| 147 | 21 609 | 12.12436 | 38.34058 | 3 176 523 | 5.277 632 | 11.37031 | 24.49660 |
| 148 | 21 904 | 12.16553 | 38.47077 | 3 241 792 | 5.289 572 | 11.39604 | 24.55202 |
| 149 | 22 201 | 12.20656 | 38.60052 | 3 307 949 | 5.301 459 | 11.42165 | 24.60719 |
| 150 | 22 500 | 12.24745 | 38.72983 | 3 375 000 | 5.313 293 | 11.44714 | 24.66212 |

SQUARES, CUBES AND ROOTS (Continued)

| n | n^2 | \sqrt{n} | $\sqrt{10n}$ | n^3 | $\sqrt[3]{n}$ | $\sqrt[3]{10n}$ | $\sqrt[3]{100n}$ |
|-----|--------|------------|--------------|-----------|---------------|-----------------|------------------|
| 150 | 22 500 | 12.24745 | 38.72983 | 3 375 000 | 5.313 293 | 11.44714 | 24.66212 |
| 151 | 22 801 | 12.28821 | 38.85872 | 3 442 951 | 5.325 074 | 11.47252 | 24.71680 |
| 152 | 23 104 | 12.32883 | 38.98718 | 3 511 808 | 5.336 803 | 11.49779 | 24.77125 |
| 153 | 23 409 | 12.36932 | 39.11521 | 3 581 577 | 5.348 481 | 11.52295 | 24.82545 |
| 154 | 23 716 | 12.40967 | 39.24283 | 3 652 264 | 5.360 108 | 11.54800 | 24.87942 |
| 155 | 24 025 | 12.44990 | 39.37004 | 3 723 875 | 5.371 685 | 11.57295 | 24.93315 |
| 156 | 24 336 | 12.49000 | 39.49684 | 3 796 416 | 5.383 213 | 11.59778 | 24.98666 |
| 157 | 24 649 | 12.52996 | 39.62323 | 3 869 893 | 5.394 691 | 11.62251 | 25.03994 |
| 158 | 24 964 | 12.56981 | 39.74921 | 3 944 312 | 5.406 120 | 11.64713 | 25.09299 |
| 159 | 25 281 | 12.60952 | 39.87480 | 4 019 679 | 5.417 502 | 11.67165 | 25.14581 |
| 160 | 25 600 | 12.64911 | 40.00000 | 4 096 000 | 5.428 835 | 11.69607 | 25.19842 |
| 161 | 25 921 | 12.68858 | 40.12481 | 4 173 281 | 5.440 122 | 11.72039 | 25.25081 |
| 162 | 26 244 | 12.72792 | 40.24922 | 4 251 528 | 5.451 362 | 11.74460 | 25.30298 |
| 163 | 26 569 | 12.76715 | 40.37326 | 4 330 747 | 5.462 556 | 11.76872 | 25.35494 |
| 164 | 26 896 | 12.80625 | 40.49691 | 4 410 944 | 5.473 704 | 11.79274 | 25.40668 |
| 165 | 27 225 | 12.84523 | 40.62019 | 4 492 125 | 5.484 807 | 11.81666 | 25.45822 |
| 166 | 27 556 | 12.88410 | 40.74310 | 4 574 296 | 5.495 865 | 11.84048 | 25.50954 |
| 167 | 27 889 | 12.92285 | 40.86563 | 4 657 463 | 5.506 878 | 11.86421 | 25.56067 |
| 168 | 28 224 | 12.96148 | 40.98780 | 4 741 632 | 5.517 848 | 11.88784 | 25.61158 |
| 169 | 28 561 | 13.00000 | 41.10961 | 4 826 809 | 5.528 775 | 11.91138 | 25.66230 |
| 170 | 28 900 | 13.03840 | 41.23106 | 4 913 000 | 5.539 658 | 11.93483 | 25.71282 |
| 171 | 29 241 | 13.07670 | 41.35215 | 5 000 211 | 5.550 499 | 11.95819 | 25.76313 |
| 172 | 29 584 | 13.11488 | 41.47288 | 5 088 448 | 5.561 298 | 11.98145 | 25.81326 |
| 173 | 29 929 | 13.15295 | 41.59327 | 5 177 717 | 5.572 055 | 12.00463 | 25.86319 |
| 174 | 30 276 | 13.19091 | 41.71331 | 5 268 024 | 5.582 770 | 12.02771 | 25.91292 |
| 175 | 30 625 | 13.22876 | 41.83300 | 5 359 375 | 5.593 445 | 12.05071 | 25.96247 |
| 176 | 30 976 | 13.26650 | 41.95235 | 5 451 776 | 5.604 079 | 12.07362 | 26.01183 |
| 177 | 31 329 | 13.30413 | 42.07137 | 5 545 233 | 5.614 672 | 12.09645 | 26.06100 |
| 178 | 31 684 | 13.34166 | 42.19005 | 5 639 752 | 5.625 226 | 12.11918 | 26.10999 |
| 179 | 32 041 | 13.37909 | 42.30839 | 5 735 339 | 5.635 741 | 12.14184 | 26.15879 |
| 180 | 32 400 | 13.41641 | 42.42641 | 5 832 000 | 5.646 216 | 12.16440 | 26.20741 |
| 181 | 32 761 | 13.45362 | 42.54409 | 5 929 741 | 5.656 653 | 12.18689 | 26.25586 |
| 182 | 33 124 | 13.49074 | 42.66146 | 6 028 568 | 5.667 051 | 12.20929 | 26.30412 |
| 183 | 33 489 | 13.52775 | 42.77850 | 6 128 487 | 5.677 411 | 12.23161 | 26.35221 |
| 184 | 33 856 | 13.56466 | 42.89522 | 6 229 504 | 5.687 734 | 12.25385 | 26.40012 |
| 185 | 34 225 | 13.60147 | 43.01163 | 6 331 625 | 5.698 019 | 12.27601 | 26.44786 |
| 186 | 34 596 | 13.63818 | 43.12772 | 6 434 856 | 5.708 267 | 12.29809 | 26.49543 |
| 187 | 34 969 | 13.67479 | 43.24350 | 6 539 203 | 5.718 479 | 12.32009 | 26.54283 |
| 188 | 35 344 | 13.71131 | 43.35897 | 6 644 672 | 5.728 654 | 12.34201 | 26.59006 |
| 189 | 35 721 | 13.74773 | 43.47413 | 6 751 269 | 5.738 794 | 12.36386 | 26.63712 |
| 190 | 36 100 | 13.78405 | 43.58899 | 6 859 000 | 5.748 897 | 12.38562 | 26.68402 |
| 191 | 36 481 | 13.82027 | 43.70355 | 6 967 871 | 5.758 965 | 12.40731 | 26.73075 |
| 192 | 36 864 | 13.85641 | 43.81780 | 7 077 888 | 5.768 998 | 12.42893 | 26.77732 |
| 193 | 37 249 | 13.89244 | 43.93177 | 7 189 057 | 5.778 997 | 12.45047 | 26.82373 |
| 194 | 37 636 | 13.92839 | 44.04543 | 7 301 384 | 5.788 960 | 12.47194 | 26.86997 |
| 195 | 38 025 | 13.96424 | 44.15880 | 7 414 875 | 5.798 890 | 12.49333 | 26.91606 |
| 196 | 38 416 | 14.00000 | 44.27189 | 7 529 536 | 5.808 786 | 12.51465 | 26.96199 |
| 197 | 38 809 | 14.03567 | 44.38468 | 7 645 373 | 5.818 648 | 12.53590 | 27.00777 |
| 198 | 39 204 | 14.07125 | 44.49719 | 7 762 392 | 5.828 477 | 12.55707 | 27.05339 |
| 199 | 39 601 | 14.10674 | 44.60942 | 7 880 599 | 5.838 272 | 12.57818 | 27.09886 |
| 200 | 40 000 | 14.14214 | 44.72136 | 8 000 000 | 5.848 035 | 12.59921 | 27.14418 |

SQUARES, CUBES AND ROOTS (Continued)

| n | n^2 | \sqrt{n} | $\sqrt{10n}$ | n^3 | $\sqrt[3]{n}$ | $\sqrt[3]{10n}$ | $\sqrt[3]{100n}$ |
|-----|--------|------------|--------------|------------|---------------|-----------------|------------------|
| 200 | 40 000 | 14.14214 | 44.72136 | 8 000 000 | 5.848 035 | 12.59921 | 27.14418 |
| 201 | 40 401 | 14.17745 | 44.83302 | 8 120 601 | 5.857 766 | 12.62017 | 27.18934 |
| 202 | 40 804 | 14.21267 | 44.94441 | 8 242 408 | 5.867 464 | 12.64107 | 27.23436 |
| 203 | 41 209 | 14.24781 | 45.05552 | 8 365 427 | 5.877 131 | 12.66189 | 27.27922 |
| 204 | 41 616 | 14.28286 | 45.16636 | 8 489 664 | 5.886 765 | 12.68265 | 27.32394 |
| 205 | 42 025 | 14.31782 | 45.27693 | 8 615 125 | 5.896 369 | 12.70334 | 27.36852 |
| 206 | 42 436 | 14.35270 | 45.38722 | 8 741 816 | 5.905 941 | 12.72396 | 27.41295 |
| 207 | 42 849 | 14.38749 | 45.49725 | 8 869 743 | 5.915 482 | 12.74452 | 27.45723 |
| 208 | 43 264 | 14.42221 | 45.60702 | 8 998 912 | 5.924 992 | 12.76501 | 27.50138 |
| 209 | 43 681 | 14.45683 | 45.71652 | 9 129 329 | 5.934 472 | 12.78543 | 27.54538 |
| 210 | 44 100 | 14.49138 | 45.82576 | 9 261 000 | 5.943 922 | 12.80579 | 27.58924 |
| 211 | 44 521 | 14.52584 | 45.93474 | 9 393 931 | 5.953 342 | 12.82609 | 27.63296 |
| 212 | 44 944 | 14.56022 | 46.04346 | 9 528 128 | 5.962 732 | 12.84632 | 27.67655 |
| 213 | 45 369 | 14.59452 | 46.15192 | 9 663 597 | 5.972 093 | 12.86648 | 27.72000 |
| 214 | 45 796 | 14.62874 | 46.26013 | 9 800 344 | 5.981 424 | 12.88659 | 27.76331 |
| 215 | 46 225 | 14.66288 | 46.36809 | 9 938 375 | 5.990 726 | 12.90663 | 27.80649 |
| 216 | 46 656 | 14.69694 | 46.47580 | 10 077 696 | 6.000 000 | 12.92661 | 27.84953 |
| 217 | 47 089 | 14.73092 | 46.58326 | 10 218 313 | 6.009 245 | 12.94653 | 27.89244 |
| 218 | 47 524 | 14.76482 | 46.69047 | 10 360 232 | 6.018 462 | 12.96638 | 27.93522 |
| 219 | 47 961 | 14.79865 | 46.79744 | 10 503 459 | 6.027 650 | 12.98618 | 27.97787 |
| 220 | 48 400 | 14.83240 | 46.90416 | 10 648 000 | 6.036 811 | 13.00591 | 28.02039 |
| 221 | 48 841 | 14.86607 | 47.01064 | 10 793 861 | 6.045 944 | 13.02559 | 28.06278 |
| 222 | 49 284 | 14.89966 | 47.11688 | 10 941 048 | 6.055 049 | 13.04521 | 28.10505 |
| 223 | 49 729 | 14.93318 | 47.22288 | 11 089 567 | 6.064 127 | 13.06477 | 28.14718 |
| 224 | 50 176 | 14.96663 | 47.32864 | 11 239 424 | 6.073 178 | 13.08427 | 28.18919 |
| 225 | 50 625 | 15.00000 | 47.43416 | 11 390 625 | 6.082 202 | 13.10371 | 28.23108 |
| 226 | 51 076 | 15.03330 | 47.53946 | 11 543 176 | 6.091 199 | 13.12309 | 28.27284 |
| 227 | 51 529 | 15.06652 | 47.64452 | 11 697 083 | 6.100 170 | 13.14242 | 28.31448 |
| 228 | 51 984 | 15.09967 | 47.74935 | 11 852 352 | 6.109 115 | 13.16169 | 28.35600 |
| 229 | 52 441 | 15.13275 | 47.85394 | 12 008 989 | 6.118 033 | 13.18090 | 28.39739 |
| 230 | 52 900 | 15.16575 | 47.95832 | 12 167 000 | 6.126 926 | 13.20006 | 28.43867 |
| 231 | 53 361 | 15.19868 | 48.06246 | 12 326 391 | 6.135 792 | 13.21916 | 28.47983 |
| 232 | 53 824 | 15.23155 | 48.16638 | 12 487 168 | 6.144 634 | 13.23821 | 28.52086 |
| 233 | 54 289 | 15.26434 | 48.27007 | 12 649 337 | 6.153 449 | 13.25721 | 28.56178 |
| 234 | 54 756 | 15.29706 | 48.37355 | 12 812 904 | 6.162 240 | 13.27614 | 28.60259 |
| 235 | 55 225 | 15.32971 | 48.47680 | 12 977 875 | 6.171 006 | 13.29503 | 28.64327 |
| 236 | 55 696 | 15.36229 | 48.57983 | 13 144 256 | 6.179 747 | 13.31386 | 28.68384 |
| 237 | 56 169 | 15.39480 | 48.68265 | 13 312 053 | 6.188 463 | 13.33264 | 28.72430 |
| 238 | 56 644 | 15.42725 | 48.78524 | 13 481 272 | 6.197 154 | 13.35136 | 28.76464 |
| 239 | 57 121 | 15.45962 | 48.88763 | 13 651 919 | 6.205 822 | 13.37004 | 28.80487 |
| 240 | 57 600 | 15.49193 | 48.98979 | 13 824 000 | 6.214 465 | 13.38866 | 28.84499 |
| 241 | 58 081 | 15.52417 | 49.09175 | 13 997 521 | 6.223 084 | 13.40723 | 28.88500 |
| 242 | 58 564 | 15.55635 | 49.19350 | 14 172 488 | 6.231 680 | 13.42575 | 28.92489 |
| 243 | 59 049 | 15.58846 | 49.29503 | 14 348 907 | 6.240 251 | 13.44421 | 28.96468 |
| 244 | 59 536 | 15.62050 | 49.39636 | 14 526 784 | 6.248 800 | 13.46263 | 29.00436 |
| 245 | 60 025 | 15.65248 | 49.49747 | 14 706 125 | 6.257 325 | 13.48100 | 29.04393 |
| 246 | 60 516 | 15.68439 | 49.59839 | 14 886 936 | 6.265 827 | 13.49931 | 29.08339 |
| 247 | 61 009 | 15.71623 | 49.69909 | 15 069 223 | 6.274 305 | 13.51758 | 29.12275 |
| 248 | 61 504 | 15.74802 | 49.79960 | 15 252 992 | 6.282 761 | 13.53580 | 29.16199 |
| 249 | 62 001 | 15.77973 | 49.89990 | 15 438 249 | 6.291 195 | 13.55397 | 29.20114 |
| 250 | 62 500 | 15.81139 | 50.00000 | 15 625 000 | 6.299 605 | 13.57209 | 29.24018 |

SQUARES, CUBES AND ROOTS (Continued)

| n | n^2 | \sqrt{n} | $\sqrt{10n}$ | n^3 | $\sqrt[3]{n}$ | $\sqrt[3]{10n}$ | $\sqrt[3]{100n}$ |
|-----|--------|------------|--------------|------------|---------------|-----------------|------------------|
| 250 | 62 500 | 15.81139 | 50.00000 | 15 625 000 | 6.299 605 | 13.57209 | 29.24018 |
| 251 | 63 001 | 15.84298 | 50.09990 | 15 813 251 | 6.307 994 | 13.59016 | 29.27911 |
| 252 | 63 504 | 15.87451 | 50.19960 | 16 003 008 | 6.316 360 | 13.60818 | 29.31794 |
| 253 | 64 009 | 15.90597 | 50.29911 | 16 194 277 | 6.324 704 | 13.62616 | 29.35667 |
| 254 | 64 516 | 15.93738 | 50.39841 | 16 387 064 | 6.333 026 | 13.64409 | 29.39530 |
| 255 | 65 025 | 15.96872 | 50.49752 | 16 581 375 | 6.341 326 | 13.66197 | 29.43383 |
| 256 | 65 536 | 16.00000 | 50.59644 | 16 777 216 | 6.349 604 | 13.67981 | 29.47225 |
| 257 | 66 049 | 16.03122 | 50.69517 | 16 974 593 | 6.357 861 | 13.69760 | 29.51058 |
| 258 | 66 564 | 16.06238 | 50.79370 | 17 173 512 | 6.366 097 | 13.71534 | 29.54880 |
| 259 | 67 081 | 16.09348 | 50.89204 | 17 373 979 | 6.374 311 | 13.73304 | 29.58693 |
| 260 | 67 600 | 16.12452 | 50.99020 | 17 576 000 | 6.382 504 | 13.75069 | 29.62496 |
| 261 | 68 121 | 16.15549 | 51.08816 | 17 779 581 | 6.390 677 | 13.76830 | 29.66289 |
| 262 | 68 644 | 16.18641 | 51.18594 | 17 984 728 | 6.398 828 | 13.78586 | 29.70073 |
| 263 | 69 169 | 16.21727 | 51.28353 | 18 191 447 | 6.406 959 | 13.80337 | 29.73847 |
| 264 | 69 696 | 16.24808 | 51.38093 | 18 399 744 | 6.415 069 | 13.82085 | 29.77611 |
| 265 | 70 225 | 16.27882 | 51.47815 | 18 609 625 | 6.423 158 | 13.83828 | 29.81366 |
| 266 | 70 756 | 16.30951 | 51.57519 | 18 821 096 | 6.431 228 | 13.85566 | 29.85111 |
| 267 | 71 289 | 16.34013 | 51.67204 | 19 034 163 | 6.439 277 | 13.87300 | 29.88847 |
| 268 | 71 824 | 16.37071 | 51.76872 | 19 248 832 | 6.447 306 | 13.89030 | 29.92574 |
| 269 | 72 361 | 16.40122 | 51.86521 | 19 465 109 | 6.455 315 | 13.90755 | 29.96292 |
| 270 | 72 900 | 16.43168 | 51.96152 | 19 683 000 | 6.463 304 | 13.92477 | 30.00000 |
| 271 | 73 441 | 16.46208 | 52.05766 | 19 902 511 | 6.471 274 | 13.94194 | 30.03699 |
| 272 | 73 984 | 16.49242 | 52.15362 | 20 123 648 | 6.479 224 | 13.95906 | 30.07389 |
| 273 | 74 529 | 16.52271 | 52.24940 | 20 346 417 | 6.487 154 | 13.97615 | 30.11070 |
| 274 | 75 076 | 16.55295 | 52.34501 | 20 570 824 | 6.495 065 | 13.99319 | 30.14742 |
| 275 | 75 625 | 16.58312 | 52.44044 | 20 796 875 | 6.502 957 | 14.01020 | 30.18405 |
| 276 | 76 176 | 16.61325 | 52.53570 | 21 024 576 | 6.510 830 | 14.02716 | 30.22060 |
| 277 | 76 729 | 16.64332 | 52.63079 | 21 253 933 | 6.518 684 | 14.04408 | 30.25705 |
| 278 | 77 284 | 16.67333 | 52.72571 | 21 484 952 | 6.526 519 | 14.06096 | 30.29342 |
| 279 | 77 841 | 16.70329 | 52.82045 | 21 717 639 | 6.534 335 | 14.07780 | 30.32970 |
| 280 | 78 400 | 16.73320 | 52.91503 | 21 952 000 | 6.542 133 | 14.09460 | 30.36589 |
| 281 | 78 961 | 16.76305 | 53.00943 | 22 188 041 | 6.549 912 | 14.11136 | 30.40200 |
| 282 | 79 524 | 16.79286 | 53.10367 | 22 425 768 | 6.557 672 | 14.12808 | 30.43802 |
| 283 | 80 089 | 16.82260 | 53.19774 | 22 665 187 | 6.565 414 | 14.14476 | 30.47395 |
| 284 | 80 656 | 16.85230 | 53.29165 | 22 906 304 | 6.573 138 | 14.16140 | 30.50981 |
| 285 | 81 225 | 16.88194 | 53.38539 | 23 149 125 | 6.580 844 | 14.17800 | 30.54557 |
| 286 | 81 796 | 16.91153 | 53.47897 | 23 393 656 | 6.588 532 | 14.19456 | 30.58126 |
| 287 | 82 369 | 16.94107 | 53.57238 | 23 639 903 | 6.596 202 | 14.21109 | 30.61686 |
| 288 | 82 944 | 16.97056 | 53.66563 | 23 887 872 | 6.603 854 | 14.22757 | 30.65238 |
| 289 | 83 521 | 17.00000 | 53.75872 | 24 137 569 | 6.611 489 | 14.24402 | 30.68781 |
| 290 | 84 100 | 17.02939 | 53.85165 | 24 389 000 | 6.619 106 | 14.26043 | 30.72317 |
| 291 | 84 681 | 17.05872 | 53.94442 | 24 642 171 | 6.626 705 | 14.27680 | 30.75844 |
| 292 | 85 264 | 17.08801 | 54.03702 | 24 897 088 | 6.634 287 | 14.29314 | 30.79363 |
| 293 | 85 849 | 17.11724 | 54.12947 | 25 153 757 | 6.641 852 | 14.30944 | 30.82875 |
| 294 | 86 436 | 17.14643 | 54.22177 | 25 412 184 | 6.649 400 | 14.32570 | 30.86378 |
| 295 | 87 025 | 17.17556 | 54.31390 | 25 672 375 | 6.656 930 | 14.34192 | 30.89873 |
| 296 | 87 616 | 17.20465 | 54.40588 | 25 934 336 | 6.664 444 | 14.35811 | 30.93361 |
| 297 | 88 209 | 17.23369 | 54.49771 | 26 198 073 | 6.671 940 | 14.37426 | 30.96840 |
| 298 | 88 804 | 17.26268 | 54.58938 | 26 463 592 | 6.679 420 | 14.39037 | 31.00312 |
| 299 | 89 401 | 17.29162 | 54.68089 | 26 730 899 | 6.686 883 | 14.40645 | 31.03776 |
| 300 | 90 000 | 17.32051 | 54.77226 | 27 000 000 | 6.694 330 | 14.42250 | 31.07233 |

SQUARES, CUBES AND ROOTS (Continued)

| n | n^2 | \sqrt{n} | $\sqrt{10n}$ | n^3 | $\sqrt[3]{n}$ | $\sqrt[3]{10n}$ | $\sqrt[3]{100n}$ |
|-----|---------|------------|--------------|------------|---------------|-----------------|------------------|
| 300 | 90 000 | 17.32051 | 54.77226 | 27 000 000 | 6.694 330 | 14.42250 | 31.07233 |
| 301 | 90 601 | 17.34935 | 54.86347 | 27 270 901 | 6.701 759 | 14.43850 | 31.10681 |
| 302 | 91 204 | 17.37815 | 54.95453 | 27 543 608 | 6.709 173 | 14.45447 | 31.14122 |
| 303 | 91 809 | 17.40690 | 55.04544 | 27 818 127 | 6.716 570 | 14.47041 | 31.17556 |
| 304 | 92 416 | 17.43560 | 55.13620 | 28 094 464 | 6.723 951 | 14.48631 | 31.20982 |
| 305 | 93 025 | 17.46425 | 55.22681 | 28 372 625 | 6.731 315 | 14.50218 | 31.24400 |
| 306 | 93 636 | 17.49286 | 55.31727 | 28 652 616 | 6.738 664 | 14.51801 | 31.27811 |
| 307 | 94 249 | 17.52142 | 55.40758 | 28 934 443 | 6.745 997 | 14.53381 | 31.31214 |
| 308 | 94 864 | 17.54993 | 55.49775 | 29 218 112 | 6.753 313 | 14.54957 | 31.34610 |
| 309 | 95 481 | 17.57840 | 55.58777 | 29 503 629 | 6.760 614 | 14.56530 | 31.37999 |
| 310 | 96 100 | 17.60682 | 55.67764 | 29 791 000 | 6.767 899 | 14.58100 | 31.41381 |
| 311 | 96 721 | 17.63519 | 55.76737 | 30 080 231 | 6.775 169 | 14.59666 | 31.44755 |
| 312 | 97 344 | 17.66352 | 55.85696 | 30 371 328 | 6.782 423 | 14.61229 | 31.48122 |
| 313 | 97 969 | 17.69181 | 55.94640 | 30 664 297 | 6.789 661 | 14.62788 | 31.51482 |
| 314 | 98 596 | 17.72005 | 56.03570 | 30 959 144 | 6.796 884 | 14.64344 | 31.54834 |
| 315 | 99 225 | 17.74824 | 56.12486 | 31 255 875 | 6.804 092 | 14.65897 | 31.58180 |
| 316 | 99 856 | 17.77639 | 56.21388 | 31 554 496 | 6.811 285 | 14.67447 | 31.61518 |
| 317 | 100 489 | 17.80449 | 56.30275 | 31 855 013 | 6.818 462 | 14.68993 | 31.64850 |
| 318 | 101 124 | 17.83255 | 56.39149 | 32 157 432 | 6.825 624 | 14.70536 | 31.68174 |
| 319 | 101 761 | 17.86057 | 56.48008 | 32 461 759 | 6.832 771 | 14.72076 | 31.71492 |
| 320 | 102 400 | 17.88854 | 56.56854 | 32 768 000 | 6.839 904 | 14.73613 | 31.74802 |
| 321 | 103 041 | 17.91647 | 56.65686 | 33 076 161 | 6.847 021 | 14.75146 | 31.78106 |
| 322 | 103 684 | 17.94436 | 56.74504 | 33 386 248 | 6.854 124 | 14.76676 | 31.81403 |
| 323 | 104 329 | 17.97220 | 56.83309 | 33 698 267 | 6.861 212 | 14.78203 | 31.84693 |
| 324 | 104 976 | 18.00000 | 56.92100 | 34 012 224 | 6.868 285 | 14.79727 | 31.87976 |
| 325 | 105 625 | 18.02776 | 57.00877 | 34 328 125 | 6.875 344 | 14.81248 | 31.91252 |
| 326 | 106 276 | 18.05547 | 57.09641 | 34 645 976 | 6.882 389 | 14.82766 | 31.94522 |
| 327 | 106 929 | 18.08314 | 57.18391 | 34 965 783 | 6.889 419 | 14.84280 | 31.97785 |
| 328 | 107 584 | 18.11077 | 57.27128 | 35 287 552 | 6.896 434 | 14.85792 | 32.01041 |
| 329 | 108 241 | 18.13836 | 57.35852 | 35 611 289 | 6.903 436 | 14.87300 | 32.04291 |
| 330 | 108 900 | 18.16590 | 57.44563 | 35 937 000 | 6.910 423 | 14.88806 | 32.07534 |
| 331 | 109 561 | 18.19341 | 57.53260 | 36 264 691 | 6.917 396 | 14.90308 | 32.10771 |
| 332 | 110 224 | 18.22087 | 57.61944 | 36 594 368 | 6.924 356 | 14.91807 | 32.14001 |
| 333 | 110 889 | 18.24829 | 57.70615 | 36 926 037 | 6.931 301 | 14.93303 | 32.17225 |
| 334 | 111 556 | 18.27567 | 57.79273 | 37 259 704 | 6.938 232 | 14.94797 | 32.20442 |
| 335 | 112 225 | 18.30301 | 57.87918 | 37 595 375 | 6.945 150 | 14.96287 | 32.23653 |
| 336 | 112 896 | 18.33030 | 57.96551 | 37 933 056 | 6.952 053 | 14.97774 | 32.26857 |
| 337 | 113 569 | 18.35756 | 58.05170 | 38 272 753 | 6.958 943 | 14.99259 | 32.30055 |
| 338 | 114 244 | 18.38478 | 58.13777 | 38 614 472 | 6.965 820 | 15.00740 | 32.33247 |
| 339 | 114 921 | 18.41195 | 58.22371 | 38 958 219 | 6.972 683 | 15.02219 | 32.36433 |
| 340 | 115 600 | 18.43909 | 58.30952 | 39 304 000 | 6.979 532 | 15.03695 | 32.39612 |
| 341 | 116 281 | 18.46619 | 58.39521 | 39 651 821 | 6.986 368 | 15.05167 | 32.42785 |
| 342 | 116 964 | 18.49324 | 58.48077 | 40 001 688 | 6.993 191 | 15.06637 | 32.45952 |
| 343 | 117 649 | 18.52026 | 58.56620 | 40 353 607 | 7.000 000 | 15.08104 | 32.49112 |
| 344 | 118 336 | 18.54724 | 58.65151 | 40 707 584 | 7.006 796 | 15.09568 | 32.52267 |
| 345 | 119 025 | 18.57418 | 58.73670 | 41 063 625 | 7.013 579 | 15.11030 | 32.55415 |
| 346 | 119 716 | 18.60108 | 58.82176 | 41 421 736 | 7.020 349 | 15.12488 | 32.58557 |
| 347 | 120 409 | 18.62794 | 58.90671 | 41 781 923 | 7.027 106 | 15.13944 | 32.61694 |
| 348 | 121 104 | 18.65476 | 58.99152 | 42 144 192 | 7.033 850 | 15.15397 | 32.64824 |
| 349 | 121 801 | 18.68154 | 59.07622 | 42 508 549 | 7.040 581 | 15.16847 | 32.67948 |
| 350 | 122 500 | 18.70829 | 59.16080 | 42 875 000 | 7.047 299 | 15.18294 | 32.71066 |

SQUARES, CUBES AND ROOTS (Continued)

| n | n^2 | \sqrt{n} | $\sqrt{10n}$ | n^3 | $\sqrt[3]{n}$ | $\sqrt[3]{10n}$ | $\sqrt[3]{100n}$ |
|-----|---------|------------|--------------|------------|---------------|-----------------|------------------|
| 350 | 122 500 | 18.70829 | 59.16080 | 42 875 000 | 7.047 299 | 15.18294 | 32.71066 |
| 351 | 123 201 | 18.73499 | 59.24525 | 43 243 551 | 7.054 004 | 15.19739 | 32.74179 |
| 352 | 123 904 | 18.76166 | 59.32959 | 43 614 208 | 7.060 697 | 15.21181 | 32.77285 |
| 353 | 124 609 | 18.78829 | 59.41380 | 43 986 977 | 7.067 377 | 15.22620 | 32.80386 |
| 354 | 125 316 | 18.81489 | 59.49790 | 44 361 864 | 7.074 044 | 15.24057 | 32.83480 |
| 355 | 126 025 | 18.84144 | 59.58188 | 44 738 875 | 7.080 699 | 15.25490 | 32.86569 |
| 356 | 126 736 | 18.86796 | 59.66574 | 45 118 016 | 7.087 341 | 15.26921 | 32.89652 |
| 357 | 127 449 | 18.89444 | 59.74948 | 45 499 293 | 7.093 971 | 15.28350 | 32.92730 |
| 358 | 128 164 | 18.92089 | 59.83310 | 45 882 712 | 7.100 588 | 15.29775 | 32.95801 |
| 359 | 128 881 | 18.94730 | 59.91661 | 46 268 279 | 7.107 194 | 15.31198 | 32.98867 |
| 360 | 129 600 | 18.97367 | 60.00000 | 46 656 000 | 7.113 787 | 15.32619 | 33.01927 |
| 361 | 130 321 | 19.00000 | 60.08328 | 47 045 881 | 7.120 367 | 15.34037 | 33.04982 |
| 362 | 131 044 | 19.02630 | 60.16644 | 47 437 928 | 7.126 936 | 15.35452 | 33.08031 |
| 363 | 131 769 | 19.05256 | 60.24948 | 47 832 147 | 7.133 492 | 15.36864 | 33.11074 |
| 364 | 132 496 | 19.07878 | 60.33241 | 48 228 544 | 7.140 037 | 15.38274 | 33.14112 |
| 365 | 133 225 | 19.10497 | 60.41523 | 48 627 125 | 7.146 569 | 15.39682 | 33.17144 |
| 366 | 133 956 | 19.13113 | 60.49793 | 49 027 896 | 7.153 090 | 15.41087 | 33.20170 |
| 367 | 134 689 | 19.15724 | 60.58052 | 49 430 863 | 7.159 599 | 15.42489 | 33.23191 |
| 368 | 135 424 | 19.18333 | 60.66300 | 49 836 032 | 7.166 096 | 15.43889 | 33.26207 |
| 369 | 136 161 | 19.20937 | 60.74537 | 50 243 409 | 7.172 581 | 15.45286 | 33.29217 |
| 370 | 136 900 | 19.23538 | 60.82763 | 50 653 000 | 7.179 054 | 15.46680 | 33.32222 |
| 371 | 137 641 | 19.26136 | 60.90977 | 51 064 811 | 7.185 516 | 15.48073 | 33.35221 |
| 372 | 138 384 | 19.28730 | 60.99180 | 51 478 848 | 7.191 966 | 15.49462 | 33.38215 |
| 373 | 139 129 | 19.31321 | 61.07373 | 51 895 117 | 7.198 405 | 15.50849 | 33.41204 |
| 374 | 139 876 | 19.33908 | 61.15554 | 52 313 624 | 7.204 832 | 15.52234 | 33.44187 |
| 375 | 140 625 | 19.36492 | 61.23724 | 52 734 375 | 7.211 248 | 15.53616 | 33.47165 |
| 376 | 141 376 | 19.39072 | 61.31884 | 53 157 376 | 7.217 652 | 15.54996 | 33.50137 |
| 377 | 142 129 | 19.41649 | 61.40033 | 53 582 633 | 7.224 045 | 15.56373 | 33.53105 |
| 378 | 142 884 | 19.44222 | 61.48170 | 54 010 152 | 7.230 427 | 15.57748 | 33.56067 |
| 379 | 143 641 | 19.46792 | 61.56298 | 54 439 939 | 7.236 797 | 15.59121 | 33.59024 |
| 380 | 144 400 | 19.49359 | 61.64414 | 54 872 000 | 7.243 156 | 15.60491 | 33.61975 |
| 381 | 145 161 | 19.51922 | 61.72520 | 55 306 341 | 7.249 505 | 15.61858 | 33.64922 |
| 382 | 145 924 | 19.54482 | 61.80615 | 55 742 968 | 7.255 842 | 15.63224 | 33.67863 |
| 383 | 146 689 | 19.57039 | 61.88699 | 56 181 887 | 7.262 167 | 15.64587 | 33.70800 |
| 384 | 147 456 | 19.59592 | 61.96773 | 56 623 104 | 7.268 482 | 15.65947 | 33.73731 |
| 385 | 148 225 | 19.62142 | 62.04837 | 57 066 625 | 7.274 786 | 15.67305 | 33.76657 |
| 386 | 148 996 | 19.64688 | 62.12890 | 57 512 456 | 7.281 079 | 15.68661 | 33.79578 |
| 387 | 149 769 | 19.67232 | 62.20932 | 57 960 603 | 7.287 362 | 15.70014 | 33.82494 |
| 388 | 150 544 | 19.69772 | 62.28965 | 58 411 072 | 7.293 633 | 15.71366 | 33.85405 |
| 389 | 151 321 | 19.72308 | 62.36986 | 58 863 869 | 7.299 894 | 15.72714 | 33.88310 |
| 390 | 152 100 | 19.74842 | 62.44998 | 59 319 000 | 7.306 144 | 15.74061 | 33.91211 |
| 391 | 152 881 | 19.77372 | 62.52999 | 59 776 471 | 7.312 383 | 15.75405 | 33.94107 |
| 392 | 153 664 | 19.79899 | 62.60990 | 60 236 288 | 7.318 611 | 15.76747 | 33.96999 |
| 393 | 154 449 | 19.82423 | 62.68971 | 60 698 457 | 7.324 829 | 15.78087 | 33.99885 |
| 394 | 155 236 | 19.84943 | 62.76942 | 61 162 984 | 7.331 037 | 15.79424 | 34.02766 |
| 395 | 156 025 | 19.87461 | 62.84903 | 61 629 875 | 7.337 234 | 15.80759 | 34.05642 |
| 396 | 156 816 | 19.89975 | 62.92853 | 62 099 136 | 7.343 420 | 15.82092 | 34.08514 |
| 397 | 157 609 | 19.92486 | 63.00794 | 62 570 773 | 7.349 597 | 15.83423 | 34.11381 |
| 398 | 158 404 | 19.94994 | 63.08724 | 63 044 792 | 7.355 762 | 15.84751 | 34.14242 |
| 399 | 159 201 | 19.97498 | 63.16645 | 63 521 199 | 7.361 918 | 15.86077 | 34.17106 |
| 400 | 160 000 | 20.00000 | 63.24555 | 64 000 000 | 7.368 063 | 15.87401 | 34.19952 |

SQUARES, CUBES AND ROOTS (Continued)

| n | n^2 | \sqrt{n} | $\sqrt{10n}$ | n^3 | $\sqrt[3]{n}$ | $\sqrt[3]{10n}$ | $\sqrt[3]{100n}$ |
|-----|---------|------------|--------------|------------|---------------|-----------------|------------------|
| 400 | 160 000 | 20.00000 | 63.24555 | 64 000 000 | 7.368 063 | 15.87401 | 34.19952 |
| 401 | 160 801 | 20.02498 | 63.32456 | 64 481 201 | 7.374 198 | 15.88723 | 34.22799 |
| 402 | 161 604 | 20.04994 | 63.40347 | 64 964 808 | 7.380 323 | 15.90042 | 34.25642 |
| 403 | 162 409 | 20.07486 | 63.48228 | 65 450 827 | 7.386 437 | 15.91360 | 34.28480 |
| 404 | 163 216 | 20.09975 | 63.56099 | 65 939 264 | 7.392 542 | 15.92675 | 34.31314 |
| 405 | 164 025 | 20.12461 | 63.63961 | 66 430 125 | 7.398 636 | 15.93988 | 34.34143 |
| 406 | 164 836 | 20.14944 | 63.71813 | 66 923 416 | 7.404 721 | 15.95299 | 34.36967 |
| 407 | 165 649 | 20.17424 | 63.79655 | 67 419 143 | 7.410 795 | 15.96607 | 34.39786 |
| 408 | 166 464 | 20.19901 | 63.87488 | 67 917 312 | 7.416 860 | 15.97914 | 34.42601 |
| 409 | 167 281 | 20.22375 | 63.95311 | 68 417 929 | 7.422 914 | 15.99218 | 34.45412 |
| 410 | 168 100 | 20.24846 | 64.03124 | 68 921 000 | 7.428 959 | 16.00521 | 34.48217 |
| 411 | 168 921 | 20.27313 | 64.10928 | 69 426 531 | 7.434 994 | 16.01821 | 34.51018 |
| 412 | 169 744 | 20.29778 | 64.18723 | 69 934 528 | 7.441 019 | 16.03119 | 34.53815 |
| 413 | 170 569 | 20.32240 | 64.26508 | 70 444 997 | 7.447 034 | 16.04415 | 34.56607 |
| 414 | 171 396 | 20.34699 | 64.34283 | 70 957 944 | 7.453 040 | 16.05709 | 34.59395 |
| 415 | 172 225 | 20.37155 | 64.42049 | 71 473 375 | 7.459 036 | 16.07001 | 34.62178 |
| 416 | 173 056 | 20.39608 | 64.49806 | 71 991 296 | 7.465 022 | 16.08290 | 34.64956 |
| 417 | 173 889 | 20.42058 | 64.57554 | 72 511 713 | 7.470 999 | 16.09578 | 34.67731 |
| 418 | 174 724 | 20.44505 | 64.65292 | 73 034 632 | 7.476 966 | 16.10864 | 34.70500 |
| 419 | 175 561 | 20.46949 | 64.73021 | 73 560 059 | 7.482 924 | 16.12147 | 34.73266 |
| 420 | 176 400 | 20.49390 | 64.80741 | 74 088 000 | 7.488 872 | 16.13429 | 34.76027 |
| 421 | 177 241 | 20.51828 | 64.88451 | 74 618 461 | 7.494 811 | 16.14708 | 34.78783 |
| 422 | 178 084 | 20.54264 | 64.96153 | 75 151 448 | 7.500 741 | 16.15986 | 34.81535 |
| 423 | 178 929 | 20.56696 | 65.03845 | 75 686 967 | 7.506 661 | 16.17261 | 34.84283 |
| 424 | 179 776 | 20.59126 | 65.11528 | 76 225 024 | 7.512 572 | 16.18534 | 34.87027 |
| 425 | 180 625 | 20.61553 | 65.19202 | 76 765 625 | 7.518 473 | 16.19806 | 34.89766 |
| 426 | 181 476 | 20.63977 | 65.26868 | 77 308 776 | 7.524 365 | 16.21075 | 34.92501 |
| 427 | 182 329 | 20.66398 | 65.34524 | 77 854 433 | 7.530 248 | 16.22343 | 34.95232 |
| 428 | 183 184 | 20.68816 | 65.42171 | 78 402 752 | 7.536 122 | 16.23608 | 34.97958 |
| 429 | 184 041 | 20.71232 | 65.49809 | 78 953 539 | 7.541 987 | 16.24872 | 35.00680 |
| 430 | 184 900 | 20.73644 | 65.57439 | 79 507 000 | 7.547 842 | 16.26133 | 35.03398 |
| 431 | 185 761 | 20.76054 | 65.65059 | 80 062 991 | 7.553 689 | 16.27393 | 35.06112 |
| 432 | 186 624 | 20.78461 | 65.72671 | 80 621 568 | 7.559 526 | 16.28651 | 35.08821 |
| 433 | 187 489 | 20.80865 | 65.80274 | 81 182 737 | 7.565 355 | 16.29906 | 35.11527 |
| 434 | 188 356 | 20.83267 | 65.87868 | 81 746 504 | 7.571 174 | 16.31160 | 35.14228 |
| 435 | 189 225 | 20.85665 | 65.95453 | 82 312 875 | 7.576 985 | 16.32412 | 35.16925 |
| 436 | 190 096 | 20.88061 | 66.03030 | 82 881 856 | 7.582 787 | 16.33662 | 35.19618 |
| 437 | 190 969 | 20.90454 | 66.10598 | 83 453 453 | 7.588 579 | 16.34910 | 35.22307 |
| 438 | 191 844 | 20.92845 | 66.18157 | 84 027 672 | 7.594 363 | 16.36156 | 35.24991 |
| 439 | 192 721 | 20.95233 | 66.25708 | 84 604 519 | 7.600 139 | 16.37400 | 35.27672 |
| 440 | 193 600 | 20.97618 | 66.33250 | 85 184 000 | 7.605 905 | 16.38643 | 35.30348 |
| 441 | 194 481 | 21.00000 | 66.40783 | 85 766 121 | 7.611 663 | 16.39883 | 35.33021 |
| 442 | 195 364 | 21.02380 | 66.48308 | 86 350 888 | 7.617 412 | 16.41122 | 35.35689 |
| 443 | 196 249 | 21.04757 | 66.55825 | 86 938 307 | 7.623 152 | 16.42358 | 35.38354 |
| 444 | 197 136 | 21.07131 | 66.63332 | 87 528 384 | 7.628 884 | 16.43593 | 35.41014 |
| 445 | 198 025 | 21.09502 | 66.70832 | 88 121 125 | 7.634 607 | 16.44826 | 35.43671 |
| 446 | 198 916 | 21.11871 | 66.78323 | 88 716 536 | 7.640 321 | 16.46057 | 35.46323 |
| 447 | 199 809 | 21.14237 | 66.85806 | 89 314 623 | 7.646 027 | 16.47287 | 35.48971 |
| 448 | 200 704 | 21.16601 | 66.93280 | 89 915 392 | 7.651 725 | 16.48514 | 35.51616 |
| 449 | 201 601 | 21.18962 | 67.00746 | 90 518 849 | 7.657 414 | 16.49740 | 35.54257 |
| 450 | 202 500 | 21.21320 | 67.08204 | 91 125 000 | 7.663 094 | 16.50964 | 35.56893 |

SQUARES, CUBES AND ROOTS (Continued)

| n | n^2 | $\sqrt[n]{n}$ | $\sqrt{10n}$ | n^3 | $\sqrt[n]{n}$ | $\sqrt[3]{10n}$ | $\sqrt[3]{100n}$ |
|-----|---------|---------------|--------------|-------------|---------------|-----------------|------------------|
| 450 | 202 500 | 21.21320 | 67.08204 | 91 125 000 | 7.663 094 | 16.50964 | 35.56893 |
| 451 | 203 401 | 21.23676 | 67.15653 | 91 733 851 | 7.668 766 | 16.52186 | 35.59526 |
| 452 | 204 304 | 21.26029 | 67.23095 | 92 345 408 | 7.674 430 | 16.53406 | 35.62155 |
| 453 | 205 209 | 21.28380 | 67.30527 | 92 959 677 | 7.680 086 | 16.54624 | 35.64780 |
| 454 | 206 116 | 21.30728 | 67.37952 | 93 576 664 | 7.685 733 | 16.55841 | 35.67401 |
| 455 | 207 025 | 21.33073 | 67.45369 | 94 196 375 | 7.691 372 | 16.57056 | 35.70018 |
| 456 | 207 936 | 21.35416 | 67.52777 | 94 818 816 | 7.697 002 | 16.58269 | 35.72632 |
| 457 | 208 849 | 21.37756 | 67.60178 | 95 443 993 | 7.702 625 | 16.59480 | 35.75242 |
| 458 | 209 764 | 21.40093 | 67.67570 | 96 071 912 | 7.708 239 | 16.60690 | 35.77848 |
| 459 | 210 681 | 21.42429 | 67.74954 | 96 702 579 | 7.713 845 | 16.61897 | 35.80450 |
| 460 | 211 600 | 21.44761 | 67.82330 | 97 336 000 | 7.719 443 | 16.63103 | 35.83048 |
| 461 | 212 521 | 21.47091 | 67.89698 | 97 972 181 | 7.725 032 | 16.64308 | 35.85642 |
| 462 | 213 444 | 21.49419 | 67.97058 | 98 611 128 | 7.730 614 | 16.65510 | 35.88233 |
| 463 | 214 369 | 21.51743 | 68.04410 | 99 252 847 | 7.736 188 | 16.66711 | 35.90820 |
| 464 | 215 296 | 21.54066 | 68.11755 | 99 897 344 | 7.741 753 | 16.67910 | 35.93404 |
| 465 | 216 225 | 21.56386 | 68.19091 | 100 544 625 | 7.747 311 | 16.69108 | 35.95983 |
| 466 | 217 156 | 21.58703 | 68.26419 | 101 194 696 | 7.752 861 | 16.70303 | 35.98559 |
| 467 | 218 089 | 21.61018 | 68.33740 | 101 847 563 | 7.758 402 | 16.71497 | 36.01131 |
| 468 | 219 024 | 21.63331 | 68.41053 | 102 503 232 | 7.763 936 | 16.72689 | 36.03700 |
| 469 | 219 961 | 21.65641 | 68.48357 | 103 161 709 | 7.769 462 | 16.73880 | 36.06265 |
| 470 | 220 900 | 21.67948 | 68.55655 | 103 823 000 | 7.774 980 | 16.75069 | 36.08826 |
| 471 | 221 841 | 21.70253 | 68.62944 | 104 487 111 | 7.780 490 | 16.76256 | 36.11384 |
| 472 | 222 784 | 21.72556 | 68.70226 | 105 154 048 | 7.785 993 | 16.77441 | 36.13938 |
| 473 | 223 729 | 21.74856 | 68.77500 | 105 823 817 | 7.791 488 | 16.78625 | 36.16488 |
| 474 | 224 676 | 21.77154 | 68.84766 | 106 496 424 | 7.796 976 | 16.79807 | 36.19035 |
| 475 | 225 625 | 21.79449 | 68.92024 | 107 171 875 | 7.802 454 | 16.80988 | 36.21578 |
| 476 | 226 576 | 21.81742 | 68.99275 | 107 850 176 | 7.807 925 | 16.82167 | 36.24118 |
| 477 | 227 529 | 21.84033 | 69.06519 | 108 531 333 | 7.813 389 | 16.83344 | 36.26654 |
| 478 | 228 484 | 21.86321 | 69.13754 | 109 215 352 | 7.818 846 | 16.84519 | 36.29187 |
| 479 | 229 441 | 21.88607 | 69.20983 | 109 902 239 | 7.824 294 | 16.85693 | 36.31716 |
| 480 | 230 400 | 21.90890 | 69.28203 | 110 592 000 | 7.829 735 | 16.86865 | 36.34241 |
| 481 | 231 361 | 21.93171 | 69.35416 | 111 284 641 | 7.835 169 | 16.88036 | 36.36763 |
| 482 | 232 324 | 21.95450 | 69.42622 | 111 980 168 | 7.840 595 | 16.89205 | 36.39282 |
| 483 | 233 289 | 21.97726 | 69.49820 | 112 678 587 | 7.846 013 | 16.90372 | 36.41797 |
| 484 | 234 256 | 22.00000 | 69.57011 | 113 379 904 | 7.851 424 | 16.91538 | 36.44308 |
| 485 | 235 225 | 22.02272 | 69.64194 | 114 084 125 | 7.856 828 | 16.92702 | 36.46817 |
| 486 | 236 196 | 22.04541 | 69.71370 | 114 791 256 | 7.862 224 | 16.93865 | 36.49321 |
| 487 | 237 169 | 22.06808 | 69.78539 | 115 501 303 | 7.867 613 | 16.95026 | 36.51822 |
| 488 | 238 144 | 22.09072 | 69.85700 | 116 214 272 | 7.872 994 | 16.96185 | 36.54320 |
| 489 | 239 121 | 22.11334 | 69.92853 | 116 930 169 | 7.878 368 | 16.97343 | 36.56815 |
| 490 | 240 100 | 22.13594 | 70.00000 | 117 649 000 | 7.883 735 | 16.98499 | 36.59306 |
| 491 | 241 081 | 22.15852 | 70.07139 | 118 370 771 | 7.889 095 | 16.99654 | 36.61793 |
| 492 | 242 064 | 22.18107 | 70.14271 | 119 095 488 | 7.894 447 | 17.00807 | 36.64278 |
| 493 | 243 049 | 22.20360 | 70.21396 | 119 823 157 | 7.899 792 | 17.01959 | 36.66758 |
| 494 | 244 036 | 22.22611 | 70.28513 | 120 553 784 | 7.905 129 | 17.03108 | 36.69236 |
| 495 | 245 025 | 22.24860 | 70.35624 | 121 287 375 | 7.910 460 | 17.04257 | 36.71716 |
| 496 | 246 016 | 22.27106 | 70.42727 | 122 023 936 | 7.915 783 | 17.05404 | 36.74181 |
| 497 | 247 009 | 22.29350 | 70.49823 | 122 763 473 | 7.921 099 | 17.06549 | 36.76649 |
| 498 | 248 004 | 22.31591 | 70.56912 | 123 505 992 | 7.926 408 | 17.07693 | 36.79113 |
| 499 | 249 001 | 22.33831 | 70.63993 | 124 251 499 | 7.931 710 | 17.08835 | 36.81574 |
| 500 | 250 000 | 22.36068 | 70.71068 | 125 000 000 | 7.937 005 | 17.09976 | 36.84031 |

SQUARES, CUBES AND ROOTS (Continued)

| n | n^2 | \sqrt{n} | $\sqrt{10n}$ | n^3 | $\sqrt[3]{n}$ | $\sqrt[3]{10n}$ | $\sqrt[3]{100n}$ |
|-----|---------|------------|--------------|-------------|---------------|-----------------|------------------|
| 500 | 250 000 | 22.36068 | 70.71068 | 125 000 000 | 7.937 005 | 17.09976 | 36.84031 |
| 501 | 251 001 | 22.38303 | 70.78135 | 125 751 501 | 7.942 293 | 17.11115 | 36.86486 |
| 502 | 252 004 | 22.40536 | 70.85196 | 126 506 008 | 7.947 574 | 17.12253 | 36.88937 |
| 503 | 253 009 | 22.42766 | 70.92249 | 127 263 527 | 7.952 848 | 17.13389 | 36.91385 |
| 504 | 254 016 | 22.44994 | 70.99296 | 128 024 064 | 7.958 114 | 17.14524 | 36.93830 |
| 505 | 255 025 | 22.47221 | 71.06335 | 128 787 625 | 7.963 374 | 17.15657 | 36.96271 |
| 506 | 256 036 | 22.49444 | 71.13368 | 129 554 216 | 7.968 627 | 17.16789 | 36.98709 |
| 507 | 257 049 | 22.51666 | 71.20393 | 130 323 843 | 7.973 873 | 17.17919 | 37.01144 |
| 508 | 258 064 | 22.53886 | 71.27412 | 131 096 512 | 7.979 112 | 17.19048 | 37.03576 |
| 509 | 259 081 | 22.56103 | 71.34424 | 131 872 229 | 7.984 344 | 17.20175 | 37.06004 |
| 510 | 260 100 | 22.58318 | 71.41428 | 132 651 000 | 7.989 570 | 17.21301 | 37.08430 |
| 511 | 261 121 | 22.60531 | 71.48426 | 133 432 331 | 7.994 788 | 17.22425 | 37.10852 |
| 512 | 262 144 | 22.62742 | 71.55418 | 134 217 728 | 8.000 000 | 17.23548 | 37.13271 |
| 513 | 263 169 | 22.64950 | 71.62402 | 135 005 697 | 8.005 205 | 17.24669 | 37.15687 |
| 514 | 264 196 | 22.67157 | 71.69379 | 135 796 744 | 8.010 403 | 17.25789 | 37.18100 |
| 515 | 265 225 | 22.69361 | 71.76350 | 136 590 875 | 8.015 595 | 17.26908 | 37.20509 |
| 516 | 266 256 | 22.71563 | 71.83314 | 137 388 096 | 8.020 779 | 17.28025 | 37.22916 |
| 517 | 267 289 | 22.73763 | 71.90271 | 138 188 413 | 8.025 957 | 17.29140 | 37.25319 |
| 518 | 268 324 | 22.75961 | 71.97222 | 138 991 832 | 8.031 129 | 17.30254 | 37.27720 |
| 519 | 269 361 | 22.78157 | 72.04165 | 139 798 359 | 8.036 293 | 17.31367 | 37.30117 |
| 520 | 270 400 | 22.80351 | 72.11103 | 140 608 000 | 8.041 452 | 17.32478 | 37.32511 |
| 521 | 271 441 | 22.82542 | 72.18033 | 141 420 761 | 8.046 603 | 17.33588 | 37.34902 |
| 522 | 272 484 | 22.84732 | 72.24957 | 142 236 648 | 8.051 748 | 17.34696 | 37.37290 |
| 523 | 273 529 | 22.86919 | 72.31874 | 143 055 667 | 8.056 886 | 17.35804 | 37.39675 |
| 524 | 274 576 | 22.89105 | 72.38784 | 143 877 824 | 8.062 018 | 17.36909 | 37.42057 |
| 525 | 275 625 | 22.91288 | 72.45688 | 144 703 125 | 8.067 143 | 17.38013 | 37.44436 |
| 526 | 276 676 | 22.93469 | 72.52586 | 145 531 576 | 8.072 262 | 17.39116 | 37.46812 |
| 527 | 277 729 | 22.95648 | 72.59477 | 146 363 183 | 8.077 374 | 17.40218 | 37.49185 |
| 528 | 278 784 | 22.97825 | 72.66361 | 147 197 952 | 8.082 480 | 17.41318 | 37.51555 |
| 529 | 279 841 | 23.00000 | 72.73239 | 148 035 889 | 8.087 579 | 17.42416 | 37.53922 |
| 530 | 280 900 | 23.02173 | 72.80110 | 148 877 000 | 8.092 672 | 17.43513 | 37.56286 |
| 531 | 281 961 | 23.04344 | 72.86975 | 149 721 291 | 8.097 759 | 17.44609 | 37.58647 |
| 532 | 283 024 | 23.06513 | 72.93833 | 150 568 768 | 8.102 839 | 17.45704 | 37.61005 |
| 533 | 284 089 | 23.08679 | 73.00685 | 151 419 437 | 8.107 913 | 17.46797 | 37.63360 |
| 534 | 285 156 | 23.10844 | 73.07530 | 152 273 304 | 8.112 980 | 17.47889 | 37.65712 |
| 535 | 286 225 | 23.13007 | 73.14369 | 153 130 375 | 8.118 041 | 17.48979 | 37.68061 |
| 536 | 287 296 | 23.15167 | 73.21202 | 153 990 656 | 8.123 096 | 17.50068 | 37.70407 |
| 537 | 288 369 | 23.17326 | 73.28028 | 154 854 153 | 8.128 145 | 17.51156 | 37.72751 |
| 538 | 289 444 | 23.19483 | 73.34848 | 155 720 872 | 8.133 187 | 17.52242 | 37.75091 |
| 539 | 290 521 | 23.21637 | 73.41662 | 156 590 819 | 8.138 223 | 17.53327 | 37.77429 |
| 540 | 291 600 | 23.23790 | 73.48469 | 157 464 000 | 8.143 253 | 17.54411 | 37.79763 |
| 541 | 292 681 | 23.25941 | 73.55270 | 158 340 421 | 8.148 276 | 17.55493 | 37.82095 |
| 542 | 293 764 | 23.28089 | 73.62065 | 159 220 088 | 8.153 294 | 17.56574 | 37.84424 |
| 543 | 294 849 | 23.30236 | 73.68853 | 160 103 007 | 8.158 305 | 17.57654 | 37.86750 |
| 544 | 295 936 | 23.32381 | 73.75636 | 160 989 184 | 8.163 310 | 17.58732 | 37.89073 |
| 545 | 297 025 | 23.34524 | 73.82412 | 161 878 625 | 8.168 309 | 17.59809 | 37.91393 |
| 546 | 298 116 | 23.36664 | 73.89181 | 162 771 336 | 8.173 302 | 17.60885 | 37.93711 |
| 547 | 299 209 | 23.38803 | 73.95945 | 163 667 323 | 8.178 289 | 17.61959 | 37.96025 |
| 548 | 300 304 | 23.40940 | 74.02702 | 164 566 592 | 8.183 269 | 17.63032 | 37.98337 |
| 549 | 301 401 | 23.43075 | 74.09453 | 165 469 149 | 8.188 244 | 17.64104 | 38.00646 |
| 550 | 302 500 | 23.45208 | 74.16198 | 166 375 000 | 8.193 213 | 17.65174 | 38.02952 |

SQUARES, CUBES AND ROOTS (Continued)

| n | n^2 | \sqrt{n} | $\sqrt{10n}$ | n^3 | $\sqrt[3]{n}$ | $\sqrt[3]{10n}$ | $\sqrt[3]{100n}$ |
|-----|---------|------------|--------------|-------------|---------------|-----------------|------------------|
| 550 | 302 500 | 23.45208 | 74.16198 | 166 375 000 | 8.193 213 | 17.65174 | 38.02952 |
| 551 | 303 601 | 23.47339 | 74.22937 | 167 284 151 | 8.198 175 | 17.66243 | 38.05256 |
| 552 | 304 704 | 23.49468 | 74.29670 | 168 196 608 | 8.203 132 | 17.67311 | 38.07557 |
| 553 | 305 809 | 23.51595 | 74.36397 | 169 112 377 | 8.208 082 | 17.68378 | 38.09854 |
| 554 | 306 916 | 23.53720 | 74.43118 | 170 031 464 | 8.213 027 | 17.69443 | 38.12149 |
| 555 | 308 025 | 23.55844 | 74.49832 | 170 953 875 | 8.217 966 | 17.70507 | 38.14442 |
| 556 | 309 136 | 23.57965 | 74.56541 | 171 879 616 | 8.222 899 | 17.71570 | 38.16731 |
| 557 | 310 249 | 23.60085 | 74.63243 | 172 808 693 | 8.227 825 | 17.72631 | 38.19018 |
| 558 | 311 364 | 23.62202 | 74.69940 | 173 741 112 | 8.232 746 | 17.73691 | 38.21302 |
| 559 | 312 481 | 23.64318 | 74.76630 | 174 676 879 | 8.237 661 | 17.74750 | 38.23584 |
| 560 | 313 600 | 23.66432 | 74.83315 | 175 616 000 | 8.242 571 | 17.75808 | 38.25862 |
| 561 | 314 721 | 23.68544 | 74.89993 | 176 558 481 | 8.247 474 | 17.76864 | 38.28138 |
| 562 | 315 844 | 23.70654 | 74.96666 | 177 504 328 | 8.252 372 | 17.77920 | 38.30412 |
| 563 | 316 969 | 23.72762 | 75.03333 | 178 453 547 | 8.257 263 | 17.78973 | 38.32682 |
| 564 | 318 096 | 23.74868 | 75.09993 | 179 406 144 | 8.262 149 | 17.80026 | 38.34950 |
| 565 | 319 225 | 23.76973 | 75.16648 | 180 362 125 | 8.267 029 | 17.81077 | 38.37215 |
| 566 | 320 356 | 23.79075 | 75.23297 | 181 321 496 | 8.271 904 | 17.82128 | 38.39478 |
| 567 | 321 489 | 23.81176 | 75.29940 | 182 284 263 | 8.276 773 | 17.83177 | 38.41737 |
| 568 | 322 624 | 23.83275 | 75.36577 | 183 250 432 | 8.281 635 | 17.84224 | 38.43995 |
| 569 | 323 761 | 23.85372 | 75.43209 | 184 220 009 | 8.286 493 | 17.85271 | 38.46249 |
| 570 | 324 900 | 23.87467 | 75.49834 | 185 193 000 | 8.291 344 | 17.86316 | 38.48501 |
| 571 | 326 041 | 23.89561 | 75.56454 | 186 169 411 | 8.296 190 | 17.87360 | 38.50750 |
| 572 | 327 184 | 23.91652 | 75.63068 | 187 149 248 | 8.301 031 | 17.88403 | 38.52997 |
| 573 | 328 329 | 23.93742 | 75.69676 | 188 132 517 | 8.305 865 | 17.89444 | 38.55241 |
| 574 | 329 476 | 23.95830 | 75.76279 | 189 119 224 | 8.310 694 | 17.90485 | 38.57482 |
| 575 | 330 625 | 23.97916 | 75.82875 | 190 109 375 | 8.315 517 | 17.91524 | 38.59721 |
| 576 | 331 776 | 24.00000 | 75.89466 | 191 102 976 | 8.320 335 | 17.92562 | 38.61958 |
| 577 | 332 929 | 24.02082 | 75.96052 | 192 100 033 | 8.325 148 | 17.93599 | 38.64191 |
| 578 | 334 084 | 24.04163 | 76.02631 | 193 100 552 | 8.329 954 | 17.94634 | 38.66422 |
| 579 | 335 241 | 24.06242 | 76.09205 | 194 104 539 | 8.334 755 | 17.95669 | 38.68651 |
| 580 | 336 400 | 24.08319 | 76.15773 | 195 112 000 | 8.339 551 | 17.96702 | 38.70877 |
| 581 | 337 561 | 24.10394 | 76.22336 | 196 122 941 | 8.344 341 | 17.97734 | 38.73100 |
| 582 | 338 724 | 24.12468 | 76.28892 | 197 137 368 | 8.349 126 | 17.98765 | 38.75321 |
| 583 | 339 889 | 24.14539 | 76.35444 | 198 155 287 | 8.353 905 | 17.99794 | 38.77539 |
| 584 | 341 056 | 24.16609 | 76.41989 | 199 176 704 | 8.358 678 | 18.00823 | 38.79755 |
| 585 | 342 225 | 24.18677 | 76.48529 | 200 201 625 | 8.363 447 | 18.01850 | 38.81968 |
| 586 | 343 396 | 24.20744 | 76.55064 | 201 230 056 | 8.368 209 | 18.02876 | 38.84179 |
| 587 | 344 569 | 24.22808 | 76.61593 | 202 262 003 | 8.372 967 | 18.03901 | 38.86387 |
| 588 | 345 744 | 24.24871 | 76.68116 | 203 297 472 | 8.377 719 | 18.04925 | 38.88593 |
| 589 | 346 921 | 24.26932 | 76.74634 | 204 336 469 | 8.382 465 | 18.05947 | 38.90796 |
| 590 | 348 100 | 24.28992 | 76.81146 | 205 379 000 | 8.387 207 | 18.06969 | 38.92996 |
| 591 | 349 281 | 24.31049 | 76.87652 | 206 425 071 | 8.391 942 | 18.07989 | 38.95195 |
| 592 | 350 464 | 24.33105 | 76.94154 | 207 474 688 | 8.396 673 | 18.09008 | 38.97390 |
| 593 | 351 649 | 24.35159 | 77.00649 | 208 527 857 | 8.401 398 | 18.10026 | 38.99584 |
| 594 | 352 836 | 24.37212 | 77.07140 | 209 584 584 | 8.406 118 | 18.11043 | 39.01774 |
| 595 | 354 025 | 24.39262 | 77.13624 | 210 644 875 | 8.410 833 | 18.12059 | 39.03963 |
| 596 | 355 216 | 24.41311 | 77.20104 | 211 708 736 | 8.415 542 | 18.13074 | 39.06149 |
| 597 | 356 409 | 24.43358 | 77.26578 | 212 776 173 | 8.420 246 | 18.14087 | 39.08332 |
| 598 | 357 604 | 24.45404 | 77.33046 | 213 847 192 | 8.424 945 | 18.15099 | 39.10513 |
| 599 | 358 801 | 24.47448 | 77.39509 | 214 921 799 | 8.429 638 | 18.16111 | 39.12692 |
| 600 | 360 000 | 24.49490 | 77.45967 | 216 000 000 | 8.434 327 | 18.17121 | 39.14868 |

SQUARES, CUBES AND ROOTS (Continued)

| n | n^2 | \sqrt{n} | $\sqrt{10n}$ | n^3 | $\sqrt[3]{n}$ | $\sqrt[3]{10n}$ | $\sqrt[3]{100n}$ |
|-----|---------|------------|--------------|-------------|---------------|-----------------|------------------|
| 600 | 360 000 | 24.49490 | 77.45967 | 216 000 000 | 8.434 327 | 18.17121 | 39.14868 |
| 601 | 361 201 | 24.51530 | 77.52419 | 217 081 801 | 8.439 010 | 18.18130 | 39.17041 |
| 602 | 362 404 | 24.53569 | 77.58866 | 218 167 208 | 8.443 688 | 18.19137 | 39.19213 |
| 603 | 363 609 | 24.55606 | 77.65307 | 219 256 227 | 8.448 361 | 18.20144 | 39.21382 |
| 604 | 364 816 | 24.57641 | 77.71744 | 220 348 864 | 8.453 028 | 18.21150 | 39.23548 |
| 605 | 366 025 | 24.59675 | 77.78175 | 221 445 125 | 8.457 691 | 18.22154 | 39.25712 |
| 606 | 367 236 | 24.61707 | 77.84600 | 222 545 016 | 8.462 348 | 18.23158 | 39.27874 |
| 607 | 368 449 | 24.63737 | 77.91020 | 223 648 543 | 8.467 000 | 18.24160 | 39.30033 |
| 608 | 369 664 | 24.65766 | 77.97435 | 224 755 712 | 8.471 647 | 18.25161 | 39.32190 |
| 609 | 370 881 | 24.67793 | 78.03845 | 225 866 529 | 8.476 289 | 18.26161 | 39.34345 |
| 610 | 372 100 | 24.69818 | 78.10250 | 226 981 000 | 8.480 926 | 18.27160 | 39.36497 |
| 611 | 373 321 | 24.71841 | 78.16649 | 228 099 131 | 8.485 558 | 18.28158 | 39.38647 |
| 612 | 374 544 | 24.73863 | 78.23043 | 229 220 928 | 8.490 185 | 18.29155 | 39.40795 |
| 613 | 375 769 | 24.75884 | 78.29432 | 230 346 397 | 8.494 807 | 18.30151 | 39.42940 |
| 614 | 376 996 | 24.77902 | 78.35815 | 231 475 544 | 8.499 423 | 18.31145 | 39.45083 |
| 615 | 378 225 | 24.79919 | 78.42194 | 232 608 375 | 8.504 035 | 18.32139 | 39.47223 |
| 616 | 379 456 | 24.81935 | 78.48567 | 233 744 896 | 8.508 642 | 18.33131 | 39.49362 |
| 617 | 380 689 | 24.83948 | 78.54935 | 234 885 113 | 8.513 243 | 18.34123 | 39.51498 |
| 618 | 381 924 | 24.85961 | 78.61298 | 236 029 032 | 8.517 840 | 18.35113 | 39.53631 |
| 619 | 383 161 | 24.87971 | 78.67655 | 237 176 659 | 8.522 432 | 18.36102 | 39.55763 |
| 620 | 384 400 | 24.89980 | 78.74008 | 238 328 000 | 8.527 019 | 18.37091 | 39.57892 |
| 621 | 385 641 | 24.91987 | 78.80355 | 239 483 061 | 8.531 601 | 18.38078 | 39.60018 |
| 622 | 386 884 | 24.93993 | 78.86698 | 240 641 848 | 8.536 178 | 18.39064 | 39.62143 |
| 623 | 388 129 | 24.95997 | 78.93035 | 241 804 367 | 8.540 750 | 18.40049 | 39.64265 |
| 624 | 389 376 | 24.97999 | 78.99367 | 242 970 624 | 8.545 317 | 18.41033 | 39.66385 |
| 625 | 390 625 | 25.00000 | 79.05694 | 244 140 625 | 8.549 880 | 18.42016 | 39.68503 |
| 626 | 391 876 | 25.01999 | 79.12016 | 245 314 376 | 8.554 437 | 18.42998 | 39.70618 |
| 627 | 393 129 | 25.03997 | 79.18333 | 246 491 883 | 8.558 990 | 18.43978 | 39.72731 |
| 628 | 394 384 | 25.05993 | 79.24645 | 247 673 152 | 8.563 538 | 18.44958 | 39.74842 |
| 629 | 395 641 | 25.07987 | 79.30952 | 248 858 189 | 8.568 081 | 18.45937 | 39.76951 |
| 630 | 396 900 | 25.09980 | 79.37254 | 250 047 000 | 8.572 619 | 18.46915 | 39.79057 |
| 631 | 398 161 | 25.11971 | 79.43551 | 251 239 591 | 8.577 152 | 18.47891 | 39.81161 |
| 632 | 399 424 | 25.13961 | 79.49843 | 252 435 968 | 8.581 681 | 18.48867 | 39.83263 |
| 633 | 400 689 | 25.15949 | 79.56130 | 253 636 137 | 8.586 205 | 18.49842 | 39.85363 |
| 634 | 401 956 | 25.17936 | 79.62412 | 254 840 104 | 8.590 724 | 18.50815 | 39.87461 |
| 635 | 403 225 | 25.19921 | 79.68689 | 256 047 875 | 8.595 238 | 18.51788 | 39.89556 |
| 636 | 404 496 | 25.21904 | 79.74961 | 257 259 456 | 8.599 748 | 18.52759 | 39.91649 |
| 637 | 405 769 | 25.23886 | 79.81228 | 258 474 853 | 8.604 252 | 18.53730 | 39.93740 |
| 638 | 407 044 | 25.25866 | 79.87490 | 259 694 072 | 8.608 753 | 18.54700 | 39.95829 |
| 639 | 408 321 | 25.27845 | 79.93748 | 260 917 119 | 8.613 248 | 18.55668 | 39.97916 |
| 640 | 409 600 | 25.29822 | 80.00000 | 262 144 000 | 8.617 739 | 18.56636 | 40.00000 |
| 641 | 410 881 | 25.31798 | 80.06248 | 263 374 721 | 8.622 225 | 18.57602 | 40.02082 |
| 642 | 412 164 | 25.33772 | 80.12490 | 264 609 288 | 8.626 706 | 18.58568 | 40.04162 |
| 643 | 413 449 | 25.35744 | 80.18728 | 265 847 707 | 8.631 183 | 18.59532 | 40.06240 |
| 644 | 414 736 | 25.37716 | 80.24961 | 267 089 984 | 8.635 655 | 18.60495 | 40.08316 |
| 645 | 416 025 | 25.39685 | 80.31189 | 268 336 125 | 8.640 123 | 18.61458 | 40.10390 |
| 646 | 417 316 | 25.41653 | 80.37413 | 269 586 136 | 8.644 585 | 18.62419 | 40.12461 |
| 647 | 418 609 | 25.43619 | 80.43631 | 270 840 023 | 8.649 044 | 18.63380 | 40.14530 |
| 648 | 419 904 | 25.45584 | 80.49845 | 272 097 792 | 8.653 497 | 18.64340 | 40.16598 |
| 649 | 421 201 | 25.47548 | 80.56054 | 273 359 449 | 8.657 947 | 18.65298 | 40.18663 |
| 650 | 422 500 | 25.49510 | 80.62258 | 274 625 000 | 8.662 391 | 18.66256 | 40.20726 |

SQUARES, CUBES AND ROOTS (Continued)

| n | n^2 | \sqrt{n} | $\sqrt{10n}$ | n^3 | $\sqrt[3]{n}$ | $\sqrt[3]{10n}$ | $\sqrt[3]{100n}$ |
|-----|---------|------------|--------------|-------------|---------------|-----------------|------------------|
| 650 | 422 500 | 25.49510 | 80.62258 | 274 625 000 | 8.662 391 | 18.66256 | 40.20726 |
| 651 | 423 801 | 25.51470 | 80.68457 | 275 894 451 | 8.666 831 | 18.67212 | 40.22787 |
| 652 | 425 104 | 25.53429 | 80.74652 | 277 167 808 | 8.671 266 | 18.68168 | 40.24845 |
| 653 | 426 409 | 25.55386 | 80.80842 | 278 445 077 | 8.675 697 | 18.69122 | 40.26902 |
| 654 | 427 716 | 25.57342 | 80.87027 | 279 726 264 | 8.680 124 | 18.70076 | 40.28957 |
| 655 | 429 025 | 25.59297 | 80.93207 | 281 011 375 | 8.684 546 | 18.71029 | 40.31009 |
| 656 | 430 336 | 25.61250 | 80.99383 | 282 300 416 | 8.688 963 | 18.71980 | 40.33059 |
| 657 | 431 649 | 25.63201 | 81.05554 | 283 593 393 | 8.693 376 | 18.72931 | 40.35108 |
| 658 | 432 964 | 25.65151 | 81.11720 | 284 890 312 | 8.697 784 | 18.73881 | 40.37154 |
| 659 | 434 281 | 25.67100 | 81.17881 | 286 191 179 | 8.702 188 | 18.74830 | 40.39198 |
| 660 | 435 600 | 25.69047 | 81.24038 | 287 496 000 | 8.706 588 | 18.75777 | 40.41240 |
| 661 | 436 921 | 25.70992 | 81.30191 | 288 804 781 | 8.710 983 | 18.76724 | 40.43280 |
| 662 | 438 244 | 25.72936 | 81.36338 | 290 117 528 | 8.715 373 | 18.77670 | 40.45318 |
| 663 | 439 569 | 25.74879 | 81.42481 | 291 434 247 | 8.719 760 | 18.78615 | 40.47354 |
| 664 | 440 896 | 25.76820 | 81.48620 | 292 754 944 | 8.724 141 | 18.79559 | 40.49388 |
| 665 | 442 225 | 25.78759 | 81.54753 | 294 079 625 | 8.728 519 | 18.80502 | 40.51420 |
| 666 | 443 556 | 25.80698 | 81.60882 | 295 408 296 | 8.732 892 | 18.81444 | 40.53449 |
| 667 | 444 889 | 25.82634 | 81.67007 | 296 740 963 | 8.737 260 | 18.82386 | 40.55477 |
| 668 | 446 224 | 25.84570 | 81.73127 | 298 077 632 | 8.741 625 | 18.83326 | 40.57503 |
| 669 | 447 561 | 25.86503 | 81.79242 | 299 418 309 | 8.745 985 | 18.84265 | 40.59526 |
| 670 | 448 900 | 25.88436 | 81.85353 | 300 763 000 | 8.750 340 | 18.85204 | 40.61548 |
| 671 | 450 241 | 25.90367 | 81.91459 | 302 111 711 | 8.754 691 | 18.86141 | 40.63568 |
| 672 | 451 584 | 25.92296 | 81.97561 | 303 464 448 | 8.759 038 | 18.87078 | 40.65585 |
| 673 | 452 929 | 25.94224 | 82.03658 | 304 821 217 | 8.763 381 | 18.88013 | 40.67601 |
| 674 | 454 276 | 25.96151 | 82.09750 | 306 182 024 | 8.767 719 | 18.88948 | 40.69615 |
| 675 | 455 625 | 25.98076 | 82.15838 | 307 546 875 | 8.772 053 | 18.89882 | 40.71626 |
| 676 | 456 976 | 26.00000 | 82.21922 | 308 915 776 | 8.776 383 | 18.90814 | 40.73636 |
| 677 | 458 329 | 26.01922 | 82.28001 | 310 288 733 | 8.780 708 | 18.91746 | 40.75644 |
| 678 | 459 684 | 26.03843 | 82.34076 | 311 665 752 | 8.785 030 | 18.92677 | 40.77650 |
| 679 | 461 041 | 26.05763 | 82.40146 | 313 046 839 | 8.789 347 | 18.93607 | 40.79653 |
| 680 | 462 400 | 26.07681 | 82.46211 | 314 432 000 | 8.793 659 | 18.94536 | 40.81655 |
| 681 | 463 761 | 26.09598 | 82.52272 | 315 821 241 | 8.797 968 | 18.95465 | 40.83655 |
| 682 | 465 124 | 26.11513 | 82.58329 | 317 214 568 | 8.802 272 | 18.96392 | 40.85653 |
| 683 | 466 489 | 26.13427 | 82.64381 | 318 611 987 | 8.806 572 | 18.97318 | 40.87649 |
| 684 | 467 856 | 26.15339 | 82.70429 | 320 013 504 | 8.810 868 | 18.98244 | 40.89643 |
| 685 | 469 225 | 26.17250 | 82.76473 | 321 419 125 | 8.815 160 | 18.99169 | 40.91635 |
| 686 | 470 596 | 26.19160 | 82.82512 | 322 828 856 | 8.819 447 | 19.00092 | 40.93625 |
| 687 | 471 969 | 26.21068 | 82.88546 | 324 242 703 | 8.823 731 | 19.01015 | 40.95613 |
| 688 | 473 344 | 26.22975 | 82.94577 | 325 660 672 | 8.828 010 | 19.01937 | 40.97599 |
| 689 | 474 721 | 26.24881 | 83.00602 | 327 082 769 | 8.832 285 | 19.02858 | 40.99584 |
| 690 | 476 100 | 26.26785 | 83.06624 | 328 509 000 | 8.836 556 | 19.03778 | 41.01566 |
| 691 | 477 481 | 26.28688 | 83.12641 | 329 939 371 | 8.840 823 | 19.04698 | 41.03546 |
| 692 | 478 864 | 26.30589 | 83.18654 | 331 373 888 | 8.845 085 | 19.05616 | 41.05525 |
| 693 | 480 249 | 26.32489 | 83.24662 | 332 812 557 | 8.849 344 | 19.06533 | 41.07502 |
| 694 | 481 636 | 26.34388 | 83.30666 | 334 255 384 | 8.853 599 | 19.07450 | 41.09476 |
| 695 | 483 025 | 26.36285 | 83.36666 | 335 702 375 | 8.857 849 | 19.08366 | 41.11449 |
| 696 | 484 416 | 26.38181 | 83.42661 | 337 153 536 | 8.862 095 | 19.09281 | 41.13420 |
| 697 | 485 809 | 26.40076 | 83.48653 | 338 608 873 | 8.866 338 | 19.10195 | 41.15389 |
| 698 | 487 204 | 26.41969 | 83.54639 | 340 068 392 | 8.870 576 | 19.11108 | 41.17357 |
| 699 | 488 601 | 26.43861 | 83.60622 | 341 532 099 | 8.874 810 | 19.12020 | 41.19322 |
| 700 | 490 000 | 26.45751 | 83.66600 | 343 000 000 | 8.879 040 | 19.12931 | 41.21285 |

SQUARES, CUBES AND ROOTS (Continued)

| n | n^2 | \sqrt{n} | $\sqrt{10n}$ | n^3 | $\sqrt[3]{n}$ | $\sqrt[3]{10n}$ | $\sqrt[3]{100n}$ |
|-----|---------|------------|--------------|-------------|---------------|-----------------|------------------|
| 700 | 490 000 | 26.45751 | 83.66600 | 343 000 000 | 8.879 040 | 19.12931 | 41.21285 |
| 701 | 491 401 | 26.47640 | 83.72574 | 344 472 101 | 8.883 266 | 19.13842 | 41.23247 |
| 702 | 492 804 | 26.49528 | 83.78544 | 345 948 408 | 8.887 488 | 19.14751 | 41.25207 |
| 703 | 494 209 | 26.51415 | 83.84510 | 347 428 927 | 8.891 706 | 19.15660 | 41.27164 |
| 704 | 495 616 | 26.53300 | 83.90471 | 348 913 664 | 8.895 920 | 19.16568 | 41.29120 |
| 705 | 497 025 | 26.55184 | 83.96428 | 350 402 625 | 8.900 130 | 19.17475 | 41.31075 |
| 706 | 498 436 | 26.57066 | 84.02381 | 351 895 816 | 8.904 337 | 19.18381 | 41.33027 |
| 707 | 499 849 | 26.58947 | 84.08329 | 353 393 243 | 8.908 539 | 19.19286 | 41.34977 |
| 708 | 501 264 | 26.60827 | 84.14274 | 354 894 912 | 8.912 737 | 19.20191 | 41.36926 |
| 709 | 502 681 | 26.62705 | 84.20214 | 356 400 829 | 8.916 931 | 19.21095 | 41.38873 |
| 710 | 504 100 | 26.64583 | 84.26150 | 357 911 000 | 8.921 121 | 19.21997 | 41.40818 |
| 711 | 505 521 | 26.66458 | 84.32082 | 359 425 431 | 8.925 308 | 19.22899 | 41.42761 |
| 712 | 506 944 | 26.68333 | 84.38009 | 360 944 128 | 8.929 490 | 19.23800 | 41.44702 |
| 713 | 508 369 | 26.70206 | 84.43933 | 362 467 097 | 8.933 669 | 19.24701 | 41.46642 |
| 714 | 509 796 | 26.72078 | 84.49852 | 363 994 344 | 8.937 843 | 19.25600 | 41.48579 |
| 715 | 511 225 | 26.73948 | 84.55767 | 365 525 875 | 8.942 014 | 19.26499 | 41.50515 |
| 716 | 512 656 | 26.75818 | 84.61678 | 367 061 696 | 8.946 181 | 19.27396 | 41.52449 |
| 717 | 514 089 | 26.77686 | 84.67585 | 368 601 813 | 8.950 344 | 19.28293 | 41.54382 |
| 718 | 515 524 | 26.79552 | 84.73488 | 370 146 232 | 8.954 503 | 19.29189 | 41.56312 |
| 719 | 516 961 | 26.81418 | 84.79387 | 371 694 959 | 8.958 658 | 19.30084 | 41.58241 |
| 720 | 518 400 | 26.83282 | 84.85281 | 373 248 000 | 8.962 809 | 19.30979 | 41.60168 |
| 721 | 519 841 | 26.85144 | 84.91172 | 374 805 361 | 8.966 957 | 19.31872 | 41.62093 |
| 722 | 521 284 | 26.87006 | 84.97058 | 376 367 048 | 8.971 101 | 19.32765 | 41.64016 |
| 723 | 522 729 | 26.88866 | 85.02941 | 377 933 067 | 8.975 241 | 19.33657 | 41.65938 |
| 724 | 524 176 | 26.90725 | 85.08819 | 379 503 424 | 8.979 377 | 19.34548 | 41.67857 |
| 725 | 525 625 | 26.92582 | 85.14693 | 381 078 125 | 8.983 509 | 19.35438 | 41.69775 |
| 726 | 527 076 | 26.94439 | 85.20563 | 382 657 176 | 8.987 637 | 19.36328 | 41.71692 |
| 727 | 528 529 | 26.96294 | 85.26429 | 384 240 583 | 8.991 762 | 19.37216 | 41.73606 |
| 728 | 529 984 | 26.98148 | 85.32292 | 385 828 352 | 8.995 883 | 19.38104 | 41.75519 |
| 729 | 531 441 | 27.00000 | 85.38150 | 387 420 489 | 9.000 000 | 19.38991 | 41.77430 |
| 730 | 532 900 | 27.01851 | 85.44004 | 389 017 000 | 9.004 113 | 19.39877 | 41.79339 |
| 731 | 534 361 | 27.03701 | 85.49854 | 390 617 891 | 9.008 223 | 19.40763 | 41.81247 |
| 732 | 535 824 | 27.05550 | 85.55700 | 392 223 168 | 9.012 329 | 19.41647 | 41.83152 |
| 733 | 537 289 | 27.07397 | 85.61542 | 393 832 837 | 9.016 431 | 19.42531 | 41.85056 |
| 734 | 538 756 | 27.09243 | 85.67380 | 395 446 904 | 9.020 529 | 19.43414 | 41.86959 |
| 735 | 540 225 | 27.11088 | 85.73214 | 397 065 375 | 9.024 624 | 19.44296 | 41.88859 |
| 736 | 541 696 | 27.12932 | 85.79044 | 398 688 256 | 9.028 715 | 19.45178 | 41.90758 |
| 737 | 543 169 | 27.14774 | 85.84870 | 400 315 553 | 9.032 802 | 19.46058 | 41.92655 |
| 738 | 544 644 | 27.16616 | 85.90693 | 401 947 272 | 9.036 886 | 19.46938 | 41.94551 |
| 739 | 546 121 | 27.18455 | 85.96511 | 403 583 419 | 9.040 966 | 19.47817 | 41.96444 |
| 740 | 547 600 | 27.20294 | 86.02325 | 405 224 000 | 9.045 042 | 19.48695 | 41.98336 |
| 741 | 549 081 | 27.22132 | 86.08136 | 406 869 021 | 9.049 114 | 19.49573 | 42.00227 |
| 742 | 550 564 | 27.23968 | 86.13942 | 408 518 488 | 9.053 183 | 19.50449 | 42.02115 |
| 743 | 552 049 | 27.25803 | 86.19745 | 410 172 407 | 9.057 248 | 19.51325 | 42.04002 |
| 744 | 553 536 | 27.27636 | 86.25543 | 411 830 784 | 9.061 310 | 19.52200 | 42.05887 |
| 745 | 555 025 | 27.29469 | 86.31338 | 413 493 625 | 9.065 368 | 19.53074 | 42.07771 |
| 746 | 556 516 | 27.31300 | 86.37129 | 415 160 936 | 9.069 422 | 19.53948 | 42.09653 |
| 747 | 558 009 | 27.33130 | 86.42916 | 416 832 723 | 9.073 473 | 19.54820 | 42.11533 |
| 748 | 559 504 | 27.34959 | 86.48699 | 418 508 992 | 9.077 520 | 19.55692 | 42.13411 |
| 749 | 561 001 | 27.36786 | 86.54479 | 420 189 749 | 9.081 563 | 19.56563 | 42.15288 |
| 750 | 562 500 | 27.38613 | 86.60254 | 421 875 000 | 9.085 603 | 19.57434 | 42.17163 |

SQUARES, CUBES AND ROOTS (Continued)

| n | n^2 | \sqrt{n} | $\sqrt{10n}$ | n^3 | $\sqrt[3]{n}$ | $\sqrt[3]{10n}$ | $\sqrt[3]{100n}$ |
|-----|---------|------------|--------------|-------------|---------------|-----------------|------------------|
| 750 | 562 500 | 27.38613 | 86.60254 | 421 875 000 | 9.085 603 | 19.57434 | 42.17163 |
| 751 | 564 001 | 27.40438 | 86.66026 | 423 564 751 | 9.089 639 | 19.58303 | 42.19037 |
| 752 | 565 504 | 27.42262 | 86.71793 | 425 259 008 | 9.093 672 | 19.59172 | 42.20909 |
| 753 | 567 009 | 27.44085 | 86.77557 | 426 957 777 | 9.097 701 | 19.60040 | 42.22779 |
| 754 | 568 516 | 27.45906 | 86.83317 | 428 661 064 | 9.101 727 | 19.60908 | 42.24647 |
| 755 | 570 025 | 27.47726 | 86.89074 | 430 368 875 | 9.105 748 | 19.61774 | 42.26514 |
| 756 | 571 536 | 27.49545 | 86.94826 | 432 081 216 | 9.109 767 | 19.62640 | 42.28379 |
| 757 | 573 049 | 27.51363 | 87.00575 | 433 798 093 | 9.113 782 | 19.63505 | 42.30243 |
| 758 | 574 564 | 27.53180 | 87.06320 | 435 519 512 | 9.117 793 | 19.64369 | 42.32105 |
| 759 | 576 081 | 27.54995 | 87.12061 | 437 245 479 | 9.121 801 | 19.65232 | 42.33963 |
| 760 | 577 600 | 27.56810 | 87.17798 | 438 976 000 | 9.125 805 | 19.66095 | 42.35824 |
| 761 | 579 121 | 27.58623 | 87.23531 | 440 711 081 | 9.129 806 | 19.66957 | 42.37681 |
| 762 | 580 644 | 27.60435 | 87.29261 | 442 450 728 | 9.133 803 | 19.67818 | 42.39536 |
| 763 | 582 169 | 27.62245 | 87.34987 | 444 194 947 | 9.137 797 | 19.68679 | 42.41390 |
| 764 | 583 696 | 27.64055 | 87.40709 | 445 943 744 | 9.141 787 | 19.69538 | 42.43242 |
| 765 | 585 225 | 27.65863 | 87.46428 | 447 697 125 | 9.145 774 | 19.70397 | 42.45092 |
| 766 | 586 756 | 27.67671 | 87.52143 | 449 455 096 | 9.149 758 | 19.71256 | 42.46941 |
| 767 | 588 289 | 27.69476 | 87.57854 | 451 217 663 | 9.153 738 | 19.72113 | 42.48789 |
| 768 | 589 824 | 27.71281 | 87.63561 | 452 984 832 | 9.157 714 | 19.72970 | 42.50634 |
| 769 | 591 361 | 27.73085 | 87.69265 | 454 756 609 | 9.161 687 | 19.73826 | 42.52478 |
| 770 | 592 900 | 27.74887 | 87.74964 | 456 533 000 | 9.165 656 | 19.74681 | 42.54321 |
| 771 | 594 441 | 27.76689 | 87.80661 | 458 314 011 | 9.169 623 | 19.75535 | 42.56162 |
| 772 | 595 984 | 27.78489 | 87.86353 | 460 099 648 | 9.173 585 | 19.76389 | 42.58001 |
| 773 | 597 529 | 27.80288 | 87.92042 | 461 889 917 | 9.177 544 | 19.77242 | 42.59839 |
| 774 | 599 076 | 27.82086 | 87.97727 | 463 684 824 | 9.181 500 | 19.78094 | 42.61675 |
| 775 | 600 625 | 27.83882 | 88.03408 | 465 484 375 | 9.185 453 | 19.78946 | 42.63509 |
| 776 | 602 176 | 27.85678 | 88.09086 | 467 288 576 | 9.189 402 | 19.79797 | 42.65342 |
| 777 | 603 729 | 27.87472 | 88.14760 | 469 097 433 | 9.193 347 | 19.80647 | 42.67174 |
| 778 | 605 284 | 27.89265 | 88.20431 | 470 910 952 | 9.197 290 | 19.81496 | 42.69004 |
| 779 | 606 841 | 27.91057 | 88.26098 | 472 729 139 | 9.201 229 | 19.82345 | 42.70832 |
| 780 | 608 400 | 27.92848 | 88.31761 | 474 552 000 | 9.205 164 | 19.83192 | 42.72659 |
| 781 | 609 961 | 27.94638 | 88.37420 | 476 379 541 | 9.209 096 | 19.84040 | 42.74484 |
| 782 | 611 524 | 27.96426 | 88.43076 | 478 211 768 | 9.213 025 | 19.84886 | 42.76307 |
| 783 | 613 089 | 27.98214 | 88.48729 | 480 048 687 | 9.216 950 | 19.85732 | 42.78129 |
| 784 | 614 656 | 28.00000 | 88.54377 | 481 890 304 | 9.220 873 | 19.86577 | 42.79950 |
| 785 | 616 225 | 28.01785 | 88.60023 | 483 736 625 | 9.224 791 | 19.87421 | 42.81769 |
| 786 | 617 796 | 28.03569 | 88.65664 | 485 587 656 | 9.228 707 | 19.88265 | 42.83586 |
| 787 | 619 369 | 28.05352 | 88.71302 | 487 443 403 | 9.232 619 | 19.89107 | 42.85402 |
| 788 | 620 944 | 28.07134 | 88.76936 | 489 303 872 | 9.236 528 | 19.89950 | 42.87216 |
| 789 | 622 521 | 28.08914 | 88.82567 | 491 169 069 | 9.240 433 | 19.90791 | 42.89029 |
| 790 | 624 100 | 28.10694 | 88.88194 | 493 039 000 | 9.244 335 | 19.91632 | 42.90840 |
| 791 | 625 681 | 28.12472 | 88.93818 | 494 913 671 | 9.248 234 | 19.92472 | 42.92650 |
| 792 | 627 264 | 28.14249 | 88.99438 | 496 793 088 | 9.252 130 | 19.93311 | 42.94458 |
| 793 | 628 849 | 28.16026 | 89.05055 | 498 677 257 | 9.256 022 | 19.94150 | 42.96265 |
| 794 | 630 436 | 28.17801 | 89.10668 | 500 566 184 | 9.259 911 | 19.94987 | 42.98070 |
| 795 | 632 025 | 28.19574 | 89.16277 | 502 459 875 | 9.263 797 | 19.95825 | 42.99874 |
| 796 | 633 616 | 28.21347 | 89.21883 | 504 358 336 | 9.267 680 | 19.96661 | 43.01676 |
| 797 | 635 209 | 28.23119 | 89.27486 | 506 261 573 | 9.271 559 | 19.97497 | 43.03477 |
| 798 | 636 804 | 28.24889 | 89.33085 | 508 169 592 | 9.275 435 | 19.98332 | 43.05276 |
| 799 | 638 401 | 28.26659 | 89.38680 | 510 082 399 | 9.279 308 | 19.99166 | 43.07073 |
| 800 | 640 000 | 28.28427 | 89.44272 | 512 000 000 | 9.283 178 | 20.00000 | 43.08869 |

SQUARES, CUBES AND ROOTS (Continued)

| n | n^2 | \sqrt{n} | $\sqrt{10n}$ | n^3 | $\sqrt[3]{n}$ | $\sqrt[3]{10n}$ | $\sqrt[3]{100n}$ |
|-----|---------|------------|--------------|-------------|---------------|-----------------|------------------|
| 800 | 640 000 | 28.28427 | 89.44272 | 512 000 000 | 9.283 178 | 20.00000 | 43.08869 |
| 801 | 641 601 | 28.30194 | 89.49860 | 513 922 401 | 9.287 044 | 20.00833 | 43.10664 |
| 802 | 643 204 | 28.31960 | 89.55445 | 515 849 608 | 9.290 907 | 20.01665 | 43.12457 |
| 803 | 644 809 | 28.33725 | 89.61027 | 517 781 627 | 9.294 767 | 20.02497 | 43.14249 |
| 804 | 646 416 | 28.35489 | 89.66605 | 519 718 464 | 9.298 624 | 20.03328 | 43.16039 |
| 805 | 648 025 | 28.37252 | 89.72179 | 521 660 125 | 9.302 477 | 20.04158 | 43.17828 |
| 806 | 649 636 | 28.39014 | 89.77750 | 523 606 616 | 9.306 328 | 20.04988 | 43.19615 |
| 807 | 651 249 | 28.40775 | 89.83318 | 525 557 943 | 9.310 175 | 20.05816 | 43.21400 |
| 808 | 652 864 | 28.42534 | 89.88882 | 527 514 112 | 9.314 019 | 20.06645 | 43.23185 |
| 809 | 654 481 | 28.44293 | 89.94443 | 529 475 129 | 9.317 860 | 20.07472 | 43.24967 |
| 810 | 656 100 | 28.46050 | 90.00000 | 531 441 000 | 9.321 698 | 20.08299 | 43.26749 |
| 811 | 657 721 | 28.47806 | 90.05554 | 533 411 731 | 9.325 532 | 20.09125 | 43.28529 |
| 812 | 659 344 | 28.49561 | 90.11104 | 535 387 328 | 9.329 363 | 20.09950 | 43.30307 |
| 813 | 660 969 | 28.51315 | 90.16651 | 537 367 797 | 9.333 192 | 20.10775 | 43.32084 |
| 814 | 662 596 | 28.53069 | 90.22195 | 539 353 144 | 9.337 017 | 20.11599 | 43.33859 |
| 815 | 664 225 | 28.54820 | 90.27735 | 541 343 375 | 9.340 839 | 20.12423 | 43.35633 |
| 816 | 665 856 | 28.56571 | 90.33272 | 543 338 496 | 9.344 657 | 20.13245 | 43.37406 |
| 817 | 667 489 | 28.58321 | 90.38805 | 545 338 513 | 9.348 473 | 20.14067 | 43.39177 |
| 818 | 669 124 | 28.60070 | 90.44335 | 547 343 432 | 9.352 286 | 20.14889 | 43.40947 |
| 819 | 670 761 | 28.61818 | 90.49862 | 549 353 259 | 9.356 095 | 20.15710 | 43.42715 |
| 820 | 672 400 | 28.63564 | 90.55385 | 551 368 000 | 9.359 902 | 20.16530 | 43.44481 |
| 821 | 674 041 | 28.65310 | 90.60905 | 553 387 661 | 9.363 705 | 20.17349 | 43.46247 |
| 822 | 675 684 | 28.67054 | 90.66422 | 555 412 248 | 9.367 505 | 20.18168 | 43.48011 |
| 823 | 677 329 | 28.68798 | 90.71935 | 557 441 767 | 9.371 302 | 20.18986 | 43.49773 |
| 824 | 678 976 | 28.70540 | 90.77445 | 559 476 224 | 9.375 096 | 20.19803 | 43.51534 |
| 825 | 680 625 | 28.72281 | 90.82951 | 561 515 625 | 9.378 887 | 20.20620 | 43.53294 |
| 826 | 682 276 | 28.74022 | 90.88454 | 563 559 976 | 9.382 675 | 20.21436 | 43.55052 |
| 827 | 683 929 | 28.75761 | 90.93954 | 565 609 283 | 9.386 460 | 20.22252 | 43.56809 |
| 828 | 685 584 | 28.77499 | 90.99451 | 567 663 552 | 9.390 242 | 20.23066 | 43.58564 |
| 829 | 687 241 | 28.79236 | 91.04944 | 569 722 789 | 9.394 021 | 20.23880 | 43.60318 |
| 830 | 688 900 | 28.80972 | 91.10434 | 571 787 000 | 9.397 796 | 20.24694 | 43.62071 |
| 831 | 690 561 | 28.82707 | 91.15920 | 573 856 191 | 9.401 569 | 20.25507 | 43.63822 |
| 832 | 692 224 | 28.84441 | 91.21403 | 575 930 368 | 9.405 339 | 20.26319 | 43.65572 |
| 833 | 693 889 | 28.86174 | 91.26883 | 578 009 537 | 9.409 105 | 20.27130 | 43.67320 |
| 834 | 695 556 | 28.87906 | 91.32360 | 580 093 704 | 9.412 869 | 20.27941 | 43.69067 |
| 835 | 697 225 | 28.89637 | 91.37833 | 582 182 875 | 9.416 630 | 20.28751 | 43.70812 |
| 836 | 698 896 | 28.91366 | 91.43304 | 584 277 056 | 9.420 387 | 20.29561 | 43.72556 |
| 837 | 700 569 | 28.93095 | 91.48770 | 586 376 253 | 9.424 142 | 20.30370 | 43.74299 |
| 838 | 702 244 | 28.94823 | 91.54234 | 588 480 472 | 9.427 894 | 20.31178 | 43.76041 |
| 839 | 703 921 | 28.96550 | 91.59694 | 590 589 719 | 9.431 642 | 20.31986 | 43.77781 |
| 840 | 705 600 | 28.98275 | 91.65151 | 592 704 000 | 9.435 388 | 20.32793 | 43.79519 |
| 841 | 707 281 | 29.00000 | 91.70605 | 594 823 321 | 9.439 131 | 20.33599 | 43.81256 |
| 842 | 708 964 | 29.01724 | 91.76056 | 596 947 688 | 9.442 870 | 20.34405 | 43.82992 |
| 843 | 710 649 | 29.03446 | 91.81503 | 599 077 107 | 9.446 607 | 20.35210 | 43.84727 |
| 844 | 712 336 | 29.05168 | 91.86947 | 601 211 584 | 9.450 341 | 20.36014 | 43.86460 |
| 845 | 714 025 | 29.06888 | 91.92388 | 603 351 125 | 9.454 072 | 20.36818 | 43.88191 |
| 846 | 715 716 | 29.08608 | 91.97826 | 605 495 736 | 9.457 800 | 20.37621 | 43.89922 |
| 847 | 717 409 | 29.10326 | 92.03260 | 607 645 423 | 9.461 525 | 20.38424 | 43.91651 |
| 848 | 719 104 | 29.12044 | 92.08692 | 609 800 192 | 9.465 247 | 20.39226 | 43.93378 |
| 849 | 720 801 | 29.13760 | 92.14120 | 611 960 049 | 9.468 966 | 20.40027 | 43.95105 |
| 850 | 722 500 | 29.15476 | 92.19544 | 614 125 000 | 9.472 682 | 20.40828 | 43.96830 |

SQUARES, CUBES AND ROOTS (Continued)

| n | n^2 | \sqrt{n} | $\sqrt{10n}$ | n^3 | $\sqrt[3]{n}$ | $\sqrt[3]{10n}$ | $\sqrt[3]{100n}$ |
|-----|---------|------------|--------------|-------------|---------------|-----------------|------------------|
| 850 | 722 500 | 29.15476 | 92.19544 | 614 125 000 | 9.472 682 | 20.40828 | 43.96830 |
| 851 | 724 201 | 29.17190 | 92.24966 | 616 295 051 | 9.476 396 | 20.41628 | 43.98553 |
| 852 | 725 904 | 29.18904 | 92.30385 | 618 470 208 | 9.480 106 | 20.42427 | 44.00275 |
| 853 | 727 609 | 29.20616 | 92.35800 | 620 650 477 | 9.483 814 | 20.43226 | 44.01996 |
| 854 | 729 316 | 29.22328 | 92.41212 | 622 835 864 | 9.487 518 | 20.44024 | 44.03716 |
| 855 | 731 025 | 29.24038 | 92.46621 | 625 026 375 | 9.491 220 | 20.44821 | 44.05434 |
| 856 | 732 736 | 29.25748 | 92.52027 | 627 222 016 | 9.494 919 | 20.45618 | 44.07151 |
| 857 | 734 449 | 29.27456 | 92.57429 | 629 422 793 | 9.498 615 | 20.46415 | 44.08866 |
| 858 | 736 164 | 29.29164 | 92.62829 | 631 628 712 | 9.502 308 | 20.47210 | 44.10581 |
| 859 | 737 881 | 29.30870 | 92.68225 | 633 839 779 | 9.505 998 | 20.48005 | 44.12293 |
| 860 | 739 600 | 29.32576 | 92.73618 | 636 056 000 | 9.509 685 | 20.48800 | 44.14005 |
| 861 | 741 321 | 29.34280 | 92.79009 | 638 277 381 | 9.513 370 | 20.49593 | 44.15715 |
| 862 | 743 044 | 29.35984 | 92.84396 | 640 503 928 | 9.517 052 | 20.50387 | 44.17424 |
| 863 | 744 769 | 29.37686 | 92.89779 | 642 735 647 | 9.520 730 | 20.51179 | 44.19132 |
| 864 | 746 496 | 29.39388 | 92.95160 | 644 972 544 | 9.524 406 | 20.51971 | 44.20838 |
| 865 | 748 225 | 29.41088 | 93.00538 | 647 214 625 | 9.528 079 | 20.52762 | 44.22543 |
| 866 | 749 956 | 29.42788 | 93.05912 | 649 461 896 | 9.531 750 | 20.53553 | 44.24246 |
| 867 | 751 689 | 29.44486 | 93.11283 | 651 714 363 | 9.535 417 | 20.54343 | 44.25949 |
| 868 | 753 424 | 29.46184 | 93.16652 | 653 972 032 | 9.539 082 | 20.55133 | 44.27650 |
| 869 | 755 161 | 29.47881 | 93.22017 | 656 234 909 | 9.542 744 | 20.55922 | 44.29349 |
| 870 | 756 900 | 29.49576 | 93.27379 | 658 503 000 | 9.546 403 | 20.56710 | 44.31048 |
| 871 | 758 641 | 29.51271 | 93.32738 | 660 776 311 | 9.550 059 | 20.57498 | 44.32745 |
| 872 | 760 384 | 29.52965 | 93.38094 | 663 054 848 | 9.553 712 | 20.58285 | 44.34440 |
| 873 | 762 129 | 29.54657 | 93.43447 | 665 338 617 | 9.557 363 | 20.59071 | 44.36135 |
| 874 | 763 876 | 29.56349 | 93.48797 | 667 627 624 | 9.561 011 | 20.59857 | 44.37828 |
| 875 | 765 625 | 29.58040 | 93.54143 | 669 921 875 | 9.564 656 | 20.60643 | 44.39520 |
| 876 | 767 376 | 29.59730 | 93.59487 | 672 221 376 | 9.568 298 | 20.61427 | 44.41211 |
| 877 | 769 129 | 29.61419 | 93.64828 | 674 526 133 | 9.571 938 | 20.62211 | 44.42900 |
| 878 | 770 884 | 29.63106 | 93.70165 | 676 836 152 | 9.575 574 | 20.62995 | 44.44588 |
| 879 | 772 641 | 29.64793 | 93.75500 | 679 151 439 | 9.579 208 | 20.63778 | 44.46275 |
| 880 | 774 400 | 29.66479 | 93.80832 | 681 472 000 | 9.582 840 | 20.64560 | 44.47960 |
| 881 | 776 161 | 29.68164 | 93.86160 | 683 797 841 | 9.586 468 | 20.65342 | 44.49644 |
| 882 | 777 924 | 29.69848 | 93.91486 | 686 128 968 | 9.590 094 | 20.66123 | 44.51327 |
| 883 | 779 689 | 29.71532 | 93.96808 | 688 465 387 | 9.593 717 | 20.66904 | 44.53009 |
| 884 | 781 456 | 29.73214 | 94.02127 | 690 807 104 | 9.597 337 | 20.67684 | 44.54689 |
| 885 | 783 225 | 29.74895 | 94.07444 | 693 154 125 | 9.600 955 | 20.68463 | 44.56368 |
| 886 | 784 996 | 29.76575 | 94.12757 | 695 506 456 | 9.604 570 | 20.69242 | 44.58046 |
| 887 | 786 769 | 29.78255 | 94.18068 | 697 864 103 | 9.608 182 | 20.70020 | 44.59723 |
| 888 | 788 544 | 29.79933 | 94.23375 | 700 227 072 | 9.611 791 | 20.70798 | 44.61398 |
| 889 | 790 321 | 29.81610 | 94.28680 | 702 595 369 | 9.615 398 | 20.71575 | 44.63072 |
| 890 | 792 100 | 29.83287 | 94.33981 | 704 969 000 | 9.619 002 | 20.72351 | 44.64745 |
| 891 | 793 881 | 29.84962 | 94.39280 | 707 347 971 | 9.622 603 | 20.73127 | 44.66417 |
| 892 | 795 664 | 29.86637 | 94.44575 | 709 732 288 | 9.626 202 | 20.73902 | 44.68087 |
| 893 | 797 449 | 29.88311 | 94.49868 | 712 121 957 | 9.629 797 | 20.74677 | 44.69756 |
| 894 | 799 236 | 29.89983 | 94.55157 | 714 516 984 | 9.633 391 | 20.75451 | 44.71424 |
| 895 | 801 025 | 29.91655 | 94.60444 | 716 917 375 | 9.636 981 | 20.76225 | 44.73090 |
| 896 | 802 816 | 29.93326 | 94.65728 | 719 323 136 | 9.640 569 | 20.76998 | 44.74756 |
| 897 | 804 609 | 29.94996 | 94.71008 | 721 734 273 | 9.644 154 | 20.77770 | 44.76420 |
| 898 | 806 404 | 29.96665 | 94.76286 | 724 150 792 | 9.647 737 | 20.78542 | 44.78083 |
| 899 | 808 201 | 29.98333 | 94.81561 | 726 572 699 | 9.651 317 | 20.79313 | 44.79744 |
| 900 | 810 000 | 30.00000 | 94.86833 | 729 000 000 | 9.654 894 | 20.80084 | 44.81405 |

SQUARES, CUBES AND ROOTS (Continued)

| n | n^2 | \sqrt{n} | $\sqrt{10n}$ | n^3 | $\sqrt[3]{n}$ | $\sqrt[3]{10n}$ | $\sqrt[3]{100n}$ |
|-----|---------|------------|--------------|-------------|---------------|-----------------|------------------|
| 900 | 810 009 | 30.00000 | 94.86833 | 729 000 000 | 9.654 894 | 20.80084 | 44.81405 |
| 901 | 811 801 | 30.01666 | 94.92102 | 731 432 701 | 9.658 468 | 20.80854 | 44.83064 |
| 902 | 813 604 | 30.03331 | 94.97368 | 733 870 808 | 9.662 040 | 20.81623 | 44.84722 |
| 903 | 815 409 | 30.04996 | 95.02631 | 736 314 327 | 9.665 610 | 20.82392 | 44.86379 |
| 904 | 817 216 | 30.06659 | 95.07891 | 738 763 264 | 9.669 176 | 20.83161 | 44.88034 |
| 905 | 819 025 | 30.08322 | 95.13149 | 741 217 625 | 9.672 740 | 20.83929 | 44.89688 |
| 906 | 820 836 | 30.09983 | 95.18403 | 743 677 416 | 9.676 302 | 20.84696 | 44.91341 |
| 907 | 822 649 | 30.11644 | 95.23655 | 746 142 643 | 9.679 860 | 20.85463 | 44.92993 |
| 908 | 824 464 | 30.13304 | 95.28903 | 748 613 312 | 9.683 417 | 20.86229 | 44.94644 |
| 909 | 826 281 | 30.14963 | 95.34149 | 751 089 429 | 9.686 970 | 20.86994 | 44.96293 |
| 910 | 828 100 | 30.16621 | 95.39392 | 753 571 000 | 9.690 521 | 20.87759 | 44.97941 |
| 911 | 829 921 | 30.18278 | 95.44632 | 756 058 031 | 9.694 069 | 20.88524 | 44.99588 |
| 912 | 831 744 | 30.19934 | 95.49869 | 758 550 528 | 9.697 615 | 20.89288 | 45.01234 |
| 913 | 833 569 | 30.21589 | 95.55103 | 761 048 497 | 9.701 158 | 20.90051 | 45.02879 |
| 914 | 835 396 | 30.23243 | 95.60335 | 763 551 944 | 9.704 699 | 20.90814 | 45.04522 |
| 915 | 837 225 | 30.24897 | 95.65563 | 766 060 875 | 9.708 237 | 20.91576 | 45.06164 |
| 916 | 839 056 | 30.26549 | 95.70789 | 768 575 296 | 9.711 772 | 20.92338 | 45.07805 |
| 917 | 840 889 | 30.28201 | 95.76012 | 771 095 213 | 9.715 305 | 20.93099 | 45.09445 |
| 918 | 842 724 | 30.29851 | 95.81232 | 773 620 632 | 9.718 835 | 20.93860 | 45.11084 |
| 919 | 844 561 | 30.31501 | 95.86449 | 776 151 559 | 9.722 363 | 20.94620 | 45.12721 |
| 920 | 846 400 | 30.33150 | 95.91663 | 778 688 000 | 9.725 888 | 20.95379 | 45.14357 |
| 921 | 848 241 | 30.34798 | 95.96874 | 781 229 961 | 9.729 411 | 20.96138 | 45.15992 |
| 922 | 850 084 | 30.36445 | 96.02083 | 783 777 448 | 9.732 931 | 20.96896 | 45.17626 |
| 923 | 851 929 | 30.38092 | 96.07289 | 786 330 467 | 9.736 448 | 20.97654 | 45.19259 |
| 924 | 853 776 | 30.39737 | 96.12492 | 788 889 024 | 9.739 963 | 20.98411 | 45.20891 |
| 925 | 855 625 | 30.41381 | 96.17692 | 791 453 125 | 9.743 476 | 20.99168 | 45.22521 |
| 926 | 857 476 | 30.43025 | 96.22889 | 794 022 776 | 9.746 986 | 20.99924 | 45.24150 |
| 927 | 859 329 | 30.44667 | 96.28084 | 796 597 983 | 9.750 493 | 21.00680 | 45.25778 |
| 928 | 861 184 | 30.46309 | 96.33276 | 799 178 752 | 9.753 998 | 21.01435 | 45.27405 |
| 929 | 863 041 | 30.47950 | 96.38465 | 801 765 089 | 9.757 500 | 21.02190 | 45.29030 |
| 930 | 864 900 | 30.49590 | 96.43651 | 804 357 000 | 9.761 000 | 21.02944 | 45.30655 |
| 931 | 866 761 | 30.51229 | 96.48834 | 806 954 491 | 9.764 497 | 21.03697 | 45.32278 |
| 932 | 868 624 | 30.52868 | 96.54015 | 809 557 568 | 9.767 992 | 21.04450 | 45.33900 |
| 933 | 870 489 | 30.54505 | 96.59193 | 812 166 237 | 9.771 485 | 21.05203 | 45.35521 |
| 934 | 872 356 | 30.56141 | 96.64368 | 814 780 504 | 9.774 974 | 21.05954 | 45.37141 |
| 935 | 874 225 | 30.57777 | 96.69540 | 817 400 375 | 9.778 462 | 21.06706 | 45.38760 |
| 936 | 876 096 | 30.59412 | 96.74709 | 820 025 856 | 9.781 946 | 21.07456 | 45.40377 |
| 937 | 877 969 | 30.61046 | 96.79876 | 822 656 953 | 9.785 429 | 21.08207 | 45.41994 |
| 938 | 879 844 | 30.62679 | 96.85040 | 825 293 672 | 9.788 909 | 21.08956 | 45.43609 |
| 939 | 881 721 | 30.64311 | 96.90201 | 827 936 019 | 9.792 386 | 21.09706 | 45.45223 |
| 940 | 883 600 | 30.65942 | 96.95360 | 830 584 000 | 9.795 861 | 21.10454 | 45.46836 |
| 941 | 885 481 | 30.67572 | 97.00515 | 833 237 621 | 9.799 334 | 21.11202 | 45.48448 |
| 942 | 887 364 | 30.69202 | 97.05668 | 835 896 888 | 9.802 804 | 21.11950 | 45.50058 |
| 943 | 889 249 | 30.70831 | 97.10819 | 838 561 807 | 9.806 271 | 21.12697 | 45.51668 |
| 944 | 891 136 | 30.72458 | 97.15966 | 841 232 384 | 9.809 736 | 21.13444 | 45.53276 |
| 945 | 893 025 | 30.74085 | 97.21111 | 843 908 625 | 9.813 199 | 21.14190 | 45.54883 |
| 946 | 894 916 | 30.75711 | 97.26253 | 846 590 536 | 9.816 659 | 21.14935 | 45.56490 |
| 947 | 896 809 | 30.77337 | 97.31393 | 849 278 123 | 9.820 117 | 21.15680 | 45.58095 |
| 948 | 898 704 | 30.78961 | 97.36529 | 851 971 392 | 9.823 572 | 21.16424 | 45.59699 |
| 949 | 900 601 | 30.80584 | 97.41663 | 854 670 349 | 9.827 025 | 21.17168 | 45.61301 |
| 950 | 902 500 | 30.82207 | 97.46794 | 857 375 000 | 9.830 476 | 21.17912 | 45.62903 |

SQUARES, CUBES AND ROOTS (Continued)

| n | n^2 | \sqrt{n} | $\sqrt{10n}$ | n^3 | $\sqrt[3]{n}$ | $\sqrt[3]{10n}$ | $\sqrt[3]{100n}$ |
|------|-----------|------------|--------------|---------------|---------------|-----------------|------------------|
| 950 | 902 500 | 30.82207 | 97.46794 | 857 375 000 | 9.830 476 | 21.17912 | 45.62903 |
| 951 | 904 401 | 30.83829 | 97.51923 | 860 085 351 | 9.833 924 | 21.18655 | 45.64503 |
| 952 | 906 304 | 30.85450 | 97.57049 | 862 801 408 | 9.837 369 | 21.19397 | 45.66102 |
| 953 | 908 209 | 30.87070 | 97.62172 | 865 523 177 | 9.840 813 | 21.20139 | 45.67701 |
| 954 | 910 116 | 30.88689 | 97.67292 | 868 250 664 | 9.844 254 | 21.20880 | 45.69298 |
| 955 | 912 025 | 30.90307 | 97.72410 | 870 983 875 | 9.847 692 | 21.21621 | 45.70894 |
| 956 | 913 936 | 30.91925 | 97.77525 | 873 722 816 | 9.851 128 | 21.22361 | 45.72489 |
| 957 | 915 849 | 30.93542 | 97.82638 | 876 467 493 | 9.854 562 | 21.23101 | 45.74082 |
| 958 | 917 764 | 30.95158 | 97.87747 | 879 217 912 | 9.857 993 | 21.23840 | 45.75675 |
| 959 | 919 681 | 30.96773 | 97.92855 | 881 974 079 | 9.861 422 | 21.24579 | 45.77267 |
| 960 | 921 600 | 30.98387 | 97.97959 | 884 736 000 | 9.864 848 | 21.25317 | 45.78857 |
| 961 | 923 521 | 31.00000 | 98.03061 | 887 503 681 | 9.868 272 | 21.26055 | 45.80446 |
| 962 | 925 444 | 31.01612 | 98.08160 | 890 277 128 | 9.871 694 | 21.26792 | 45.82035 |
| 963 | 927 369 | 31.03224 | 98.13256 | 893 056 347 | 9.875 113 | 21.27529 | 45.83622 |
| 964 | 929 296 | 31.04835 | 98.18350 | 895 841 344 | 9.878 530 | 21.28265 | 45.85208 |
| 965 | 931 225 | 31.06445 | 98.23441 | 898 632 125 | 9.881 945 | 21.29001 | 45.86793 |
| 966 | 933 156 | 31.08054 | 98.28530 | 901 428 696 | 9.885 357 | 21.29736 | 45.88376 |
| 967 | 935 089 | 31.09662 | 98.33616 | 904 231 063 | 9.888 767 | 21.30470 | 45.89959 |
| 968 | 937 024 | 31.11270 | 98.38699 | 907 039 232 | 9.892 175 | 21.31204 | 45.91541 |
| 969 | 938 961 | 31.12876 | 98.43780 | 909 853 209 | 9.895 580 | 21.31938 | 45.93121 |
| 970 | 940 900 | 31.14482 | 98.48858 | 912 673 000 | 9.898 983 | 21.32671 | 45.94701 |
| 971 | 942 841 | 31.16087 | 98.53933 | 915 498 611 | 9.902 384 | 21.33404 | 45.96279 |
| 972 | 944 784 | 31.17691 | 98.59006 | 918 330 048 | 9.905 782 | 21.34136 | 45.97857 |
| 973 | 946 729 | 31.19295 | 98.64076 | 921 167 317 | 9.909 178 | 21.34868 | 45.99433 |
| 974 | 948 676 | 31.20897 | 98.69144 | 924 010 424 | 9.912 571 | 21.35599 | 46.01008 |
| 975 | 950 625 | 31.22499 | 98.74209 | 926 859 375 | 9.915 962 | 21.36329 | 46.02582 |
| 976 | 952 576 | 31.24100 | 98.79271 | 929 714 176 | 9.919 351 | 21.37059 | 46.04155 |
| 977 | 954 529 | 31.25700 | 98.84331 | 932 574 833 | 9.922 738 | 21.37789 | 46.05727 |
| 978 | 956 484 | 31.27299 | 98.89388 | 935 441 352 | 9.926 122 | 21.38518 | 46.07298 |
| 979 | 958 441 | 31.28898 | 98.94443 | 938 313 739 | 9.929 504 | 21.39247 | 46.08868 |
| 980 | 960 400 | 31.30495 | 98.99495 | 941 192 000 | 9.932 884 | 21.39975 | 46.10436 |
| 981 | 962 361 | 31.32092 | 99.04544 | 944 076 141 | 9.936 261 | 21.40703 | 46.12004 |
| 982 | 964 324 | 31.33688 | 99.09591 | 946 966 168 | 9.939 636 | 21.41430 | 46.13571 |
| 983 | 966 289 | 31.35283 | 99.14636 | 949 862 087 | 9.943 009 | 21.42156 | 46.15136 |
| 984 | 968 256 | 31.36877 | 99.19677 | 952 763 904 | 9.946 380 | 21.42883 | 46.16700 |
| 985 | 970 225 | 31.38471 | 99.24717 | 955 671 625 | 9.949 748 | 21.43608 | 46.18264 |
| 986 | 972 196 | 31.40064 | 99.29753 | 958 585 256 | 9.953 114 | 21.44333 | 46.19826 |
| 987 | 974 169 | 31.41656 | 99.34787 | 961 504 803 | 9.956 478 | 21.45058 | 46.21387 |
| 988 | 976 144 | 31.43247 | 99.39819 | 964 430 272 | 9.959 839 | 21.45782 | 46.22948 |
| 989 | 978 121 | 31.44837 | 99.44848 | 967 361 669 | 9.963 198 | 21.46506 | 46.24507 |
| 990 | 980 100 | 31.46427 | 99.49874 | 970 299 000 | 9.966 555 | 21.47229 | 46.26065 |
| 991 | 982 081 | 31.48015 | 99.54898 | 973 242 271 | 9.969 910 | 21.47952 | 46.27622 |
| 992 | 984 064 | 31.49603 | 99.59920 | 976 191 488 | 9.973 262 | 21.48674 | 46.29178 |
| 993 | 986 049 | 31.51190 | 99.64939 | 979 146 657 | 9.976 612 | 21.49396 | 46.30733 |
| 994 | 988 036 | 31.52777 | 99.69955 | 982 107 784 | 9.979 960 | 21.50117 | 46.32287 |
| 995 | 990 025 | 31.54362 | 99.74969 | 985 074 875 | 9.983 305 | 21.50838 | 46.33840 |
| 996 | 992 016 | 31.55947 | 99.79980 | 988 047 936 | 9.986 649 | 21.51558 | 46.35392 |
| 997 | 994 009 | 31.57531 | 99.84989 | 991 026 973 | 9.989 999 | 21.52278 | 46.36943 |
| 998 | 996 004 | 31.59114 | 99.89995 | 994 011 992 | 9.993 329 | 21.52997 | 46.38492 |
| 999 | 998 001 | 31.60696 | 99.94999 | 997 002 999 | 9.996 666 | 21.53716 | 46.40041 |
| 1000 | 1 000 000 | 31.62278 | 100.00000 | 1 000 000 000 | 10.000 000 | 21.54435 | 46.41589 |

POWERS OF NUMBERS

| n | n^4 | n^5 | n^6 | n^7 | n^8 |
|-----|---------|-----------|---------------|------------------|------------------|
| 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 16 | 32 | 64 | 128 | 256 |
| 3 | 81 | 243 | 729 | 2187 | 6561 |
| 4 | 256 | 1024 | 4096 | 16384 | 65536 |
| 5 | 625 | 3125 | 15625 | 78125 | 390625 |
| 6 | 1296 | 7776 | 46656 | 279936 | 1679616 |
| 7 | 2401 | 16807 | 117649 | 823543 | 5764801 |
| 8 | 4096 | 32768 | 262144 | 2097152 | 16777216 |
| 9 | 6561 | 59049 | 531441 | 4782969 | 43046721 |
| | | | | $\times 10^8$ | |
| 10 | 10000 | 100000 | 1000000 | 10000000 | 1.000000 |
| 11 | 14641 | 161051 | 1771561 | 19487171 | 2.143589 |
| 12 | 20736 | 248832 | 2985984 | 35831808 | 4.299817 |
| 13 | 28561 | 371293 | 4826809 | 62748517 | 8.157307 |
| 14 | 38416 | 537824 | 7529536 | 105413504 | 14.757891 |
| 15 | 50625 | 759375 | 11390625 | 170859375 | 25.628906 |
| 16 | 65536 | 1048576 | 16777216 | 268435456 | 42.949673 |
| 17 | 83521 | 1419857 | 24137569 | 410338673 | 69.757574 |
| 18 | 104976 | 1889568 | 34012224 | 612220032 | 110.199606 |
| 19 | 130321 | 2476099 | 47045881 | 893871739 | 169.835630 |
| | | | | $\times 10^9$ | $\times 10^{10}$ |
| 20 | 160000 | 3200000 | 64000000 | 1.280000 | 2.560000 |
| 21 | 194481 | 4084101 | 85766121 | 1.801089 | 3.782286 |
| 22 | 234256 | 5153632 | 113379904 | 2.494358 | 5.487587 |
| 23 | 279841 | 6436343 | 148035889 | 3.404825 | 7.831099 |
| 24 | 331776 | 7962624 | 191102976 | 4.586471 | 11.007531 |
| 25 | 390625 | 9765625 | 244140625 | 6.103516 | 15.258789 |
| 26 | 456976 | 11881376 | 308915776 | 8.031810 | 20.882706 |
| 27 | 531441 | 14348907 | 387420489 | 10.460353 | 28.242954 |
| 28 | 614656 | 17210368 | 481890304 | 13.492929 | 37.780200 |
| 29 | 707281 | 20511149 | 594823321 | 17.249876 | 50.024641 |
| | | | $\times 10^8$ | $\times 10^{10}$ | $\times 10^{11}$ |
| 30 | 810000 | 24300000 | 7.290000 | 2.187000 | 6.561000 |
| 31 | 923521 | 28629151 | 8.875037 | 2.751261 | 8.528910 |
| 32 | 1048576 | 33554432 | 10.737418 | 3.435974 | 10.995116 |
| 33 | 1185921 | 39135393 | 12.914680 | 4.261844 | 14.064086 |
| 34 | 1336336 | 45435424 | 15.448044 | 5.252335 | 17.857939 |
| 35 | 1500625 | 52521875 | 18.382656 | 6.433930 | 22.518754 |
| 36 | 1679616 | 60466176 | 21.767823 | 7.836416 | 28.211099 |
| 37 | 1874161 | 69343957 | 25.657264 | 9.493188 | 35.124795 |
| 38 | 2085136 | 79235168 | 30.109364 | 11.441558 | 43.477921 |
| 39 | 2313441 | 90224199 | 35.187438 | 13.723101 | 53.520093 |
| | | | $\times 10^9$ | $\times 10^{10}$ | $\times 10^{12}$ |
| 40 | 2560000 | 102400000 | 4.096000 | 16.384000 | 6.553600 |
| 41 | 2825761 | 115856201 | 4.750104 | 19.475427 | 7.984925 |
| 42 | 3111696 | 130691232 | 5.489032 | 23.053933 | 9.682652 |
| 43 | 3418801 | 147008443 | 6.321363 | 27.181861 | 11.688200 |
| 44 | 3748096 | 164916224 | 7.256314 | 31.927781 | 14.048224 |
| 45 | 4100625 | 184528125 | 8.303766 | 37.366945 | 16.815125 |
| 46 | 4477456 | 205962976 | 9.474297 | 43.581766 | 20.047612 |
| 47 | 4879681 | 229345007 | 10.779215 | 50.662312 | 23.811287 |
| 48 | 5308416 | 254803968 | 12.230590 | 58.706834 | 28.179280 |
| 49 | 5764801 | 282475249 | 13.841287 | 67.822307 | 33.232931 |
| | | | | | |
| 50 | 6250000 | 312500000 | 15.625000 | 78.125000 | 39.062500 |

POWERS OF NUMBERS (Continued)

| n | n^4 | n^5 | n^6 | n^7 | n^8 |
|-----|-----------|---------------|------------------|------------------|------------------|
| | | | $\times 10^9$ | $\times 10^{11}$ | $\times 10^{13}$ |
| 50 | 6250000 | 312500000 | 15.625000 | 7.812500 | 3.906250 |
| 51 | 6765201 | 345025251 | 17.596288 | 8.974107 | 4.576794 |
| 52 | 7311616 | 380204032 | 19.770610 | 10.280717 | 5.345973 |
| 53 | 7890481 | 418195493 | 22.164361 | 11.747111 | 6.225969 |
| 54 | 8503056 | 459165024 | 24.794911 | 13.389252 | 7.230196 |
| 55 | 9150625 | 503284375 | 27.680641 | 15.224352 | 8.373394 |
| 56 | 9834496 | 550731776 | 30.840979 | 17.270948 | 9.671731 |
| 57 | 10556001 | 601692057 | 34.296447 | 19.548975 | 11.142916 |
| 58 | 11316496 | 656356768 | 38.068693 | 22.079842 | 12.806308 |
| 59 | 12117361 | 714924299 | 42.180534 | 24.886515 | 14.683044 |
| | | $\times 10^8$ | $\times 10^{10}$ | $\times 10^{11}$ | $\times 10^{13}$ |
| 60 | 12960000 | 7.776000 | 4.665600 | 27.993600 | 16.796160 |
| 61 | 13845841 | 8.445963 | 5.152037 | 31.427428 | 19.170731 |
| 62 | 14776336 | 9.161328 | 5.680024 | 35.216146 | 21.834011 |
| 63 | 15752961 | 9.924365 | 6.252350 | 39.389806 | 24.815578 |
| 64 | 16777216 | 10.737418 | 6.871948 | 43.980465 | 28.147498 |
| 65 | 17850625 | 11.602906 | 7.541889 | 49.022279 | 31.864481 |
| 66 | 18974736 | 12.523326 | 8.265395 | 54.551607 | 36.004061 |
| 67 | 20151121 | 13.501251 | 9.045838 | 60.607116 | 40.606768 |
| 68 | 21381376 | 14.539336 | 9.886748 | 67.229888 | 45.716324 |
| 69 | 22667121 | 15.640313 | 10.791816 | 74.463533 | 51.379837 |
| | | $\times 10^8$ | $\times 10^{10}$ | $\times 10^{12}$ | $\times 10^{14}$ |
| 70 | 24010000 | 16.807000 | 11.764900 | 8.235430 | 5.764801 |
| 71 | 25411681 | 18.042294 | 12.810028 | 9.095120 | 6.457535 |
| 72 | 26873856 | 19.349176 | 13.931407 | 10.030613 | 7.222041 |
| 73 | 28398241 | 20.730716 | 15.133423 | 11.047399 | 8.064601 |
| 74 | 29986576 | 22.190066 | 16.420649 | 12.151280 | 8.991947 |
| 75 | 31640625 | 23.730469 | 17.797852 | 13.348389 | 10.011292 |
| 76 | 33362176 | 25.355254 | 19.269993 | 14.645195 | 11.130348 |
| 77 | 35153041 | 27.067842 | 20.842238 | 16.048523 | 12.357363 |
| 78 | 37015056 | 28.871744 | 22.519960 | 17.565569 | 13.701144 |
| 79 | 38950081 | 30.770564 | 24.308746 | 19.203909 | 15.171088 |
| | | $\times 10^8$ | $\times 10^{10}$ | $\times 10^{12}$ | $\times 10^{14}$ |
| 80 | 40960000 | 32.768000 | 26.214400 | 20.971520 | 16.777216 |
| 81 | 43046721 | 34.867844 | 28.242954 | 22.876792 | 18.530202 |
| 82 | 45212176 | 37.073984 | 30.400667 | 24.928547 | 20.441409 |
| 83 | 47458321 | 39.390406 | 32.694037 | 27.136051 | 22.522922 |
| 84 | 49787136 | 41.821194 | 35.129803 | 29.509035 | 24.787589 |
| 85 | 52200625 | 44.370531 | 37.714952 | 32.057709 | 27.249053 |
| 86 | 54700816 | 47.042702 | 40.456724 | 34.792782 | 29.921793 |
| 87 | 57289761 | 49.842092 | 43.362620 | 37.725479 | 32.821167 |
| 88 | 59969536 | 52.773192 | 46.440409 | 40.867560 | 35.963452 |
| 89 | 62742241 | 55.840594 | 49.698129 | 44.231335 | 39.365888 |
| | | $\times 10^9$ | $\times 10^{11}$ | $\times 10^{13}$ | $\times 10^{15}$ |
| 90 | 65610000 | 5.904900 | 5.314410 | 4.782969 | 4.304672 |
| 91 | 68574961 | 6.240321 | 5.678693 | 5.167610 | 4.702525 |
| 92 | 71639296 | 6.590815 | 6.063550 | 5.578466 | 5.132189 |
| 93 | 74805201 | 6.956884 | 6.469902 | 6.017009 | 5.595818 |
| 94 | 78074896 | 7.339040 | 6.898698 | 6.484776 | 6.095689 |
| 95 | 81450625 | 7.737809 | 7.350919 | 6.983373 | 6.634204 |
| 96 | 84934656 | 8.153727 | 7.827578 | 7.514475 | 7.213896 |
| 97 | 88529281 | 8.587340 | 8.329720 | 8.079828 | 7.837434 |
| 98 | 92236816 | 9.039208 | 8.858424 | 8.681255 | 8.507630 |
| 99 | 96059601 | 9.509900 | 9.414801 | 9.320653 | 9.227447 |
| 100 | 100000000 | 10.000000 | 10.000000 | 10.000000 | 10.000000 |

FACTORIALS AND THEIR LOGARITHMS

| n | $n!$ | $\log n!$ | n | $n!$ | $\log n!$ |
|-----|-------------------------|-----------|-----|--------------------------|-----------|
| 1 | 1.0000 | 0.00000 | 50 | 3.0414×10^{64} | 64.48307 |
| 2 | 2.0000 | 0.30103 | 51 | 1.5511×10^{66} | 66.19065 |
| 3 | 6.0000 | 0.77815 | 52 | 8.0658×10^{67} | 67.90665 |
| 4 | 2.4000×10 | 1.38021 | 53 | 4.2749×10^{69} | 69.63092 |
| 5 | 1.2000×10^2 | 2.07918 | 54 | 2.3084×10^{71} | 71.36332 |
| 6 | 7.2000×10^2 | 2.85733 | 55 | 1.2696×10^{73} | 73.10368 |
| 7 | 5.0400×10^3 | 3.70243 | 56 | 7.1100×10^{74} | 74.85187 |
| 8 | 4.0320×10^4 | 4.60552 | 57 | 4.0527×10^{76} | 76.60774 |
| 9 | 3.6288×10^5 | 5.55976 | 58 | 2.3506×10^{78} | 78.37117 |
| 10 | 3.6288×10^6 | 6.55976 | 59 | 1.3868×10^{80} | 80.14202 |
| 11 | 3.9917×10^7 | 7.60116 | 60 | 8.3210×10^{81} | 81.92017 |
| 12 | 4.7900×10^8 | 8.68034 | 61 | 5.0758×10^{83} | 83.70550 |
| 13 | 6.2270×10^9 | 9.79428 | 62 | 3.1470×10^{85} | 85.49790 |
| 14 | 8.7178×10^{10} | 10.94041 | 63 | 1.9826×10^{87} | 87.29724 |
| 15 | 1.3077×10^{12} | 12.11650 | 64 | 1.2689×10^{89} | 89.10342 |
| 16 | 2.0923×10^{13} | 13.32062 | 65 | 8.2477×10^{90} | 90.91633 |
| 17 | 3.5569×10^{14} | 14.55107 | 66 | 5.4435×10^{92} | 92.73587 |
| 18 | 6.4024×10^{15} | 15.80634 | 67 | 3.6471×10^{94} | 94.56195 |
| 19 | 1.2165×10^{17} | 17.08509 | 68 | 2.4800×10^{96} | 96.39446 |
| 20 | 2.4329×10^{18} | 18.38612 | 69 | 1.7112×10^{98} | 98.23331 |
| 21 | 5.1091×10^{19} | 19.70834 | 70 | 1.1979×10^{100} | 100.07841 |
| 22 | 1.1240×10^{21} | 21.05077 | 71 | 8.5048×10^{101} | 101.92966 |
| 23 | 2.5852×10^{22} | 22.41249 | 72 | 6.1234×10^{103} | 103.78700 |
| 24 | 6.2045×10^{23} | 23.79271 | 73 | 4.4701×10^{105} | 105.65032 |
| 25 | 1.5511×10^{25} | 25.19065 | 74 | 3.3079×10^{107} | 107.51955 |
| 26 | 4.0329×10^{26} | 26.60562 | 75 | 2.4809×10^{109} | 109.39461 |
| 27 | 1.0889×10^{28} | 28.03698 | 76 | 1.8855×10^{111} | 111.27543 |
| 28 | 3.0489×10^{29} | 29.48414 | 77 | 1.4518×10^{113} | 113.16192 |
| 29 | 8.8418×10^{30} | 30.94654 | 78 | 1.1324×10^{115} | 115.05401 |
| 30 | 2.6525×10^{32} | 32.42366 | 79 | 8.9462×10^{116} | 116.95164 |
| 31 | 8.2228×10^{33} | 33.91502 | 80 | 7.1569×10^{118} | 118.85473 |
| 32 | 2.6313×10^{35} | 35.42017 | 81 | 5.7971×10^{120} | 120.76321 |
| 33 | 8.6833×10^{36} | 36.93869 | 82 | 4.7536×10^{122} | 122.67703 |
| 34 | 2.9523×10^{38} | 38.47016 | 83 | 3.9455×10^{124} | 124.59610 |
| 35 | 1.0333×10^{40} | 40.01423 | 84 | 3.3142×10^{126} | 126.52038 |
| 36 | 3.7199×10^{41} | 41.57054 | 85 | 2.8171×10^{128} | 128.44980 |
| 37 | 1.3764×10^{43} | 43.13874 | 86 | 2.4227×10^{130} | 130.38430 |
| 38 | 5.2302×10^{44} | 44.71852 | 87 | 2.1078×10^{132} | 132.32382 |
| 39 | 2.0398×10^{46} | 46.30959 | 88 | 1.8548×10^{134} | 134.26830 |
| 40 | 8.1592×10^{47} | 47.91165 | 89 | 1.6508×10^{136} | 136.21769 |
| 41 | 3.3453×10^{49} | 49.52443 | 90 | 1.4857×10^{138} | 138.17194 |
| 42 | 1.4050×10^{51} | 51.14768 | 91 | 1.3520×10^{140} | 140.13098 |
| 43 | 6.0415×10^{52} | 52.78115 | 92 | 1.2438×10^{142} | 142.09477 |
| 44 | 2.6583×10^{54} | 54.42460 | 93 | 1.1568×10^{144} | 144.06325 |
| 45 | 1.1962×10^{56} | 56.07781 | 94 | 1.0874×10^{146} | 146.03638 |
| 46 | 5.5026×10^{57} | 57.74057 | 95 | 1.0330×10^{148} | 148.01410 |
| 47 | 2.5862×10^{59} | 59.41267 | 96 | 9.9168×10^{149} | 149.99637 |
| 48 | 1.2414×10^{61} | 61.09391 | 97 | 9.6193×10^{151} | 151.98314 |
| 49 | 6.0828×10^{62} | 62.78410 | 98 | 9.4269×10^{153} | 153.97437 |
| 50 | 3.0414×10^{64} | 64.48307 | 99 | 9.3326×10^{155} | 155.97000 |
| | | | 100 | 9.3326×10^{157} | 157.97000 |

FACTORS FOR COMPUTING PROBABLE ERRORS

| n | $\frac{1}{\sqrt{n}}$ | $\frac{1}{\sqrt{n(n-1)}}$ | $\frac{.6745}{\sqrt{n-1}}$ | $\frac{.6745}{\sqrt{n(n-1)}}$ | $\frac{.8453}{n\sqrt{n-1}}$ | $\frac{.8453}{\sqrt{n(n-1)}}$ |
|-----|----------------------|---------------------------|----------------------------|-------------------------------|-----------------------------|-------------------------------|
| 2 | .707107 | .707107 | .6745 | .4769 | .4227 | .5978 |
| 3 | .577350 | .408248 | .4769 | .2754 | .1993 | .3451 |
| 4 | .500000 | .288675 | .3894 | .1947 | .1220 | .2440 |
| 5 | .447214 | .223607 | .3372 | .1508 | .0845 | .1890 |
| 6 | .408248 | .182574 | .3016 | .1231 | .0630 | .1543 |
| 7 | .377964 | .154303 | .2754 | .1041 | .0493 | .1304 |
| 8 | .353553 | .133631 | .2549 | .0901 | .0399 | .1130 |
| 9 | .333333 | .117851 | .2385 | .0795 | .0332 | .0996 |
| 10 | .316228 | .105409 | .2248 | .0711 | .0282 | .0891 |
| 11 | .301511 | .095346 | .2133 | .0643 | .0243 | .0806 |
| 12 | .288675 | .087039 | .2034 | .0587 | .0212 | .0736 |
| 13 | .277350 | .080064 | .1947 | .0540 | .0188 | .0677 |
| 14 | .267261 | .074125 | .1871 | .0500 | .0167 | .0627 |
| 15 | .258199 | .069007 | .1803 | .0465 | .0151 | .0583 |
| 16 | .250000 | .064550 | .1742 | .0435 | .0136 | .0546 |
| 17 | .242536 | .060634 | .1686 | .0409 | .0124 | .0513 |
| 18 | .235702 | .057166 | .1636 | .0386 | .0114 | .0483 |
| 19 | .229416 | .054074 | .1590 | .0365 | .0105 | .0457 |
| 20 | .223607 | .051299 | .1547 | .0346 | .0097 | .0434 |
| 21 | .218218 | .048795 | .1508 | .0329 | .0090 | .0412 |
| 22 | .213201 | .046524 | .1472 | .0314 | .0084 | .0393 |
| 23 | .208514 | .044455 | .1438 | .0300 | .0078 | .0376 |
| 24 | .204124 | .042563 | .1406 | .0287 | .0073 | .0360 |
| 25 | .200000 | .040825 | .1377 | .0275 | .0069 | .0345 |
| 26 | .196116 | .039223 | .1349 | .0265 | .0065 | .0332 |
| 27 | .192450 | .037743 | .1323 | .0255 | .0061 | .0319 |
| 28 | .188982 | .036370 | .1298 | .0245 | .0058 | .0307 |
| 29 | .185695 | .035093 | .1275 | .0237 | .0055 | .0297 |
| 30 | .182574 | .033903 | .1252 | .0229 | .0052 | .0287 |
| 31 | .179605 | .032791 | .1231 | .0221 | .0050 | .0277 |
| 32 | .176777 | .031750 | .1211 | .0214 | .0047 | .0268 |
| 33 | .174078 | .030773 | .1192 | .0208 | .0045 | .0260 |
| 34 | .171499 | .029854 | .1174 | .0201 | .0043 | .0252 |
| 35 | .169031 | .028989 | .1157 | .0196 | .0041 | .0245 |
| 36 | .166667 | .028172 | .1140 | .0190 | .0040 | .0238 |
| 37 | .164399 | .027400 | .1124 | .0185 | .0038 | .0232 |
| 38 | .162221 | .026669 | .1109 | .0180 | .0037 | .0225 |
| 39 | .160128 | .025976 | .1094 | .0175 | .0035 | .0220 |
| 40 | .158114 | .025318 | .1080 | .0171 | .0034 | .0214 |
| 41 | .156174 | .024693 | .1066 | .0167 | .0033 | .0209 |
| 42 | .154303 | .024098 | .1053 | .0163 | .0031 | .0204 |
| 43 | .152499 | .023531 | .1041 | .0159 | .0030 | .0199 |
| 44 | .150756 | .022990 | .1029 | .0155 | .0029 | .0194 |
| 45 | .149071 | .022473 | .1017 | .0152 | .0028 | .0190 |
| 46 | .147442 | .021979 | .1005 | .0148 | .0027 | .0186 |
| 47 | .145865 | .021507 | .0994 | .0145 | .0027 | .0182 |
| 48 | .144338 | .021054 | .0984 | .0142 | .0026 | .0178 |
| 49 | .142857 | .020620 | .0974 | .0139 | .0025 | .0174 |
| 50 | .141421 | .020203 | .0964 | .0136 | .0024 | .0171 |

FACTORS FOR COMPUTING PROBABLE ERRORS (Continued)

| n | $\frac{1}{\sqrt{n}}$ | $\frac{1}{\sqrt{n(n-1)}}$ | $\frac{.6745}{\sqrt{n-1}}$ | $\frac{.6745}{\sqrt{n(n-1)}}$ | $\frac{.8453}{n\sqrt{n-1}}$ | $\frac{.8453}{\sqrt{n(n-1)}}$ |
|-----|----------------------|---------------------------|----------------------------|-------------------------------|-----------------------------|-------------------------------|
| 50 | .141421 | .020203 | .0964 | .0136 | .0024 | .0171 |
| 51 | .140028 | .019803 | .0954 | .0134 | .0023 | .0167 |
| 52 | .138675 | .019418 | .0945 | .0131 | .0023 | .0164 |
| 53 | .137361 | .019048 | .0935 | .0129 | .0022 | .0161 |
| 54 | .136083 | .018692 | .0927 | .0126 | .0022 | .0158 |
| 55 | .134840 | .018349 | .0918 | .0124 | .0021 | .0155 |
| 56 | .133631 | .018019 | .0910 | .0122 | .0020 | .0152 |
| 57 | .132453 | .017700 | .0901 | .0119 | .0020 | .0150 |
| 58 | .131306 | .017392 | .0893 | .0117 | .0019 | .0147 |
| 59 | .130189 | .017095 | .0886 | .0115 | .0019 | .0145 |
| 60 | .129099 | .016807 | .0878 | .0113 | .0018 | .0142 |
| 61 | .128037 | .016529 | .0871 | .0112 | .0018 | .0140 |
| 62 | .127000 | .016261 | .0864 | .0110 | .0018 | .0138 |
| 63 | .125988 | .016001 | .0857 | .0108 | .0017 | .0135 |
| 64 | .125000 | .015749 | .0850 | .0106 | .0017 | .0133 |
| 65 | .124035 | .015504 | .0843 | .0105 | .0016 | .0131 |
| 66 | .123091 | .015268 | .0837 | .0103 | .0016 | .0129 |
| 67 | .122169 | .015038 | .0830 | .0101 | .0016 | .0127 |
| 68 | .121268 | .014815 | .0824 | .0100 | .0015 | .0125 |
| 69 | .120386 | .014599 | .0818 | .0099 | .0015 | .0123 |
| 70 | .119523 | .014389 | .0812 | .0097 | .0015 | .0122 |
| 71 | .118678 | .014185 | .0806 | .0096 | .0014 | .0120 |
| 72 | .117851 | .013986 | .0801 | .0094 | .0014 | .0118 |
| 73 | .117041 | .013793 | .0795 | .0093 | .0014 | .0117 |
| 74 | .116248 | .013606 | .0789 | .0092 | .0013 | .0115 |
| 75 | .115470 | .013423 | .0784 | .0091 | .0013 | .0113 |
| 76 | .114708 | .013245 | .0779 | .0089 | .0013 | .0112 |
| 77 | .113961 | .013072 | .0773 | .0088 | .0013 | .0111 |
| 78 | .113228 | .012904 | .0769 | .0087 | .0012 | .0109 |
| 79 | .112509 | .012739 | .0764 | .0086 | .0012 | .0108 |
| 80 | .111803 | .012579 | .0759 | .0085 | .0012 | .0106 |
| 81 | .111111 | .012423 | .0754 | .0084 | .0012 | .0105 |
| 82 | .110432 | .012270 | .0749 | .0083 | .0012 | .0104 |
| 83 | .109764 | .012121 | .0745 | .0082 | .0011 | .0103 |
| 84 | .109109 | .011976 | .0740 | .0081 | .0011 | .0101 |
| 85 | .108465 | .011835 | .0736 | .0080 | .0011 | .0100 |
| 86 | .107833 | .011696 | .0732 | .0079 | .0011 | .0099 |
| 87 | .107211 | .011561 | .0727 | .0078 | .0011 | .0098 |
| 88 | .106600 | .011429 | .0723 | .0077 | .0010 | .0097 |
| 89 | .106000 | .011300 | .0719 | .0076 | .0010 | .0096 |
| 90 | .105409 | .011173 | .0715 | .0075 | .0010 | .0094 |
| 91 | .104828 | .011050 | .0711 | .0075 | .0010 | .0093 |
| 92 | .104257 | .010929 | .0707 | .0074 | .0010 | .0092 |
| 93 | .103695 | .010811 | .0703 | .0073 | .0010 | .0091 |
| 94 | .103142 | .010695 | .0699 | .0072 | .0009 | .0090 |
| 95 | .102598 | .010582 | .0696 | .0071 | .0009 | .0089 |
| 96 | .102062 | .010471 | .0692 | .0071 | .0009 | .0089 |
| 97 | .101535 | .010363 | .0688 | .0070 | .0009 | .0088 |
| 98 | .101015 | .010257 | .0685 | .0069 | .0009 | .0087 |
| 99 | .100504 | .010152 | .0681 | .0069 | .0009 | .0086 |
| 100 | .100000 | .010050 | .0678 | .0068 | .0008 | .0085 |

PROBABILITY OF OCCURRENCE OF DEVIATIONS

Valid for thirty or more samples.

Probability of occurrence, expressed as per cent, and odds against a deviation as great or greater than that designated is given for various ratios of the deviation to the probable error and to the standard deviation.

(From Pearl, Medical Biometry and Statistics, W. B. Saunders Company, publishers, by permission.)

| Ratio dev. to P.E. | Probable occurrence % | Odds against, to 1 | Ratio dev. to std. dev. | Probable occurrence % | Odds against, to 1 |
|-----------------------|-----------------------------|--------------------------|-------------------------------|-----------------------------|--------------------------|
| 1.0 | 50.00 | 1.00 | 0.67449 | 50.00 | 1.00 |
| 1.1 | 45.81 | 1.18 | 0.7 | 48.39 | 1.07 |
| 1.2 | 41.83 | 1.39 | 0.8 | 42.37 | 1.36 |
| 1.3 | 38.06 | 1.63 | 0.9 | 36.81 | 1.72 |
| 1.4 | 34.50 | 1.90 | 1.0 | 31.73 | 2.15 |
| 1.5 | 31.17 | 2.21 | 1.1 | 27.13 | 2.69 |
| 1.6 | 28.05 | 2.57 | 1.2 | 23.01 | 3.35 |
| 1.7 | 25.15 | 2.98 | 1.3 | 19.36 | 4.17 |
| 1.8 | 22.47 | 3.45 | 1.4 | 16.15 | 5.19 |
| 1.9 | 20.00 | 4.00 | 1.5 | 13.36 | 6.48 |
| 2.0 | 17.73 | 4.64 | 1.6 | 10.96 | 8.12 |
| 2.1 | 15.67 | 5.38 | 1.7 | 8.91 | 10.22 |
| 2.2 | 13.78 | 6.25 | 1.8 | 7.19 | 12.92 |
| 2.3 | 12.08 | 7.28 | 1.9 | 5.74 | 16.41 |
| 2.4 | 10.55 | 8.48 | 2.0 | 4.55 | 20.98 |
| 2.5 | 9.18 | 9.90 | 2.1 | 3.57 | 26.99 |
| 2.6 | 7.95 | 11.58 | 2.2 | 2.78 | 34.96 |
| 2.7 | 6.86 | 13.58 | 2.3 | 2.14 | 45.62 |
| 2.8 | 5.89 | 15.96 | 2.4 | 1.64 | 59.99 |
| 2.9 | 5.05 | 18.82 | 2.5 | 1.24 | 79.52 |
| 3.0 | 4.30 | 22.24 | 2.6 | .932 | 106.3 |
| 3.1 | 3.65 | 26.37 | 2.7 | .693 | 143.2 |
| 3.2 | 3.09 | 31.36 | 2.8 | .511 | 194.7 |
| 3.3 | 2.60 | 37.42 | 2.9 | .373 | 267.0 |
| 3.4 | 2.18 | 44.80 | 3.0 | .270 | 369.4 |
| 3.5 | 1.82 | 53.82 | 3.1 | .194 | 515.7 |
| 3.6 | 1.52 | 64.89 | 3.2 | .137 | 726.7 |
| 3.7 | 1.26 | 78.53 | 3.3 | .0967 | 1,033. |
| 3.8 | 1.04 | 95.38 | 3.4 | .0674 | 1,483. |
| 3.9 | .853 | 116.3 | 3.5 | .0465 | 2,149. |
| 4.0 | .698 | 142.3 | 3.6 | .0318 | 3,142. |
| 4.1 | .569 | 174.9 | 3.7 | .0216 | 4,637. |
| 4.2 | .461 | 215.8 | 3.8 | .0145 | 6,915. |
| 4.3 | .373 | 267.2 | 3.9 | .00962 | 10,394. |
| 4.4 | .300 | 332.4 | 4.0 | .00634 | 15,772. |
| 4.5 | .240 | 415.0 | 5.0 | 5.73×10^{-5} | 1.744×10^5 |
| 4.6 | .192 | 520.4 | 6.0 | 2.0×10^{-7} | 5.0×10^8 |
| 4.7 | .152 | 655.3 | 7.0 | 2.6×10^{-10} | 3.9×10^{11} |
| 4.8 | .121 | 828.3 | | | |
| 4.9 | .0950 | 1,052. | | | |
| 5.0 | .0745 | 1,341. | | | |
| 6.0 | .0052 | 19,300. | | | |
| 7.0 | .00023 | 4.27×10^5 | | | |
| 8.0 | 6.8×10^{-6} | 1.47×10^7 | | | |
| 9.0 | 1.3×10^{-7} | 7.30×10^8 | | | |
| 10.0 | 1.5×10^{-9} | 6.5×10^{10} | | | |

AREAS, ORDINATES AND DERIVATIVES OF THE NORMAL CURVE OF ERROR

The following table gives values of the area under the curve from the ordinate at $t = 0$ to the ordinate for the values of t given in the column at the left. Values of the ordinate and of the second, third and fourth derivatives are also given.

| t | Area | Ordi- nate | Second deriva- tive | Third deriva- tive | Fourth deriva- tive | t | Area | Ordi- nate | Second deriva- tive | Third deriva- tive | Fourth deriva- tive |
|-----|-------|---------------|---------------------------|--------------------------|---------------------------|------|-------|---------------|---------------------------|--------------------------|---------------------------|
| .00 | .0000 | .3989 | — .3989 | .0000 | 1.1968 | .50 | .1915 | .3521 | — .2641 | .4841 | .5501 |
| .01 | .0040 | .3989 | — .3989 | .0120 | 1.1965 | .51 | .1950 | .3503 | — .2592 | .4895 | .5279 |
| .02 | .0080 | .3989 | — .3987 | .0239 | 1.1956 | .52 | .1985 | .3485 | — .2543 | .4947 | .5056 |
| .03 | .0120 | .3988 | — .3984 | .0359 | 1.1941 | .53 | .2019 | .3467 | — .2493 | .4996 | .4831 |
| .04 | .0160 | .3986 | — .3980 | .0478 | 1.1920 | .54 | .2054 | .3448 | — .2443 | .5043 | .4605 |
| .05 | .0199 | .3984 | — .3975 | .0597 | 1.1894 | .55 | .2088 | .3429 | — .2392 | .5088 | .4378 |
| .06 | .0239 | .3982 | — .3968 | .0716 | 1.1861 | .56 | .2123 | .3411 | — .2341 | .5131 | .4150 |
| .07 | .0279 | .3980 | — .3960 | .0834 | 1.1822 | .57 | .2157 | .3391 | — .2289 | .5171 | .3921 |
| .08 | .0319 | .3977 | — .3951 | .0952 | 1.1778 | .58 | .2190 | .3372 | — .2238 | .5209 | .3691 |
| .09 | .0359 | .3973 | — .3941 | .1070 | 1.1727 | .59 | .2224 | .3352 | — .2185 | .5245 | .3461 |
| .10 | .0398 | .3970 | — .3930 | .1187 | 1.1671 | .60 | .2258 | .3332 | — .2133 | .5278 | .3231 |
| .11 | .0438 | .3965 | — .3917 | .1303 | 1.1609 | .61 | .2291 | .3312 | — .2080 | .5309 | .3000 |
| .12 | .0478 | .3961 | — .3904 | .1419 | 1.1541 | .62 | .2324 | .3292 | — .2027 | .5338 | .2770 |
| .13 | .0517 | .3956 | — .3889 | .1534 | 1.1468 | .63 | .2357 | .3271 | — .1973 | .5365 | .2539 |
| .14 | .0557 | .3951 | — .3873 | .1648 | 1.1389 | .64 | .2389 | .3251 | — .1919 | .5389 | .2309 |
| .15 | .0596 | .3945 | — .3856 | .1762 | 1.1304 | .65 | .2422 | .3230 | — .1865 | .5411 | .2078 |
| .16 | .0636 | .3939 | — .3838 | .1874 | 1.1214 | .66 | .2454 | .3209 | — .1811 | .5431 | .1849 |
| .17 | .0675 | .3932 | — .3819 | .1986 | 1.1118 | .67 | .2486 | .3187 | — .1757 | .5448 | .1620 |
| .18 | .0714 | .3925 | — .3798 | .2097 | 1.1017 | .68 | .2518 | .3166 | — .1702 | .5463 | .1391 |
| .19 | .0754 | .3918 | — .3777 | .2206 | 1.0911 | .69 | .2549 | .3144 | — .1647 | .5476 | .1164 |
| .20 | .0793 | .3910 | — .3754 | .2315 | 1.0799 | .70 | .2580 | .3123 | — .1593 | .5486 | .0937 |
| .21 | .0832 | .3902 | — .3730 | .2422 | 1.0682 | .71 | .2612 | .3101 | — .1538 | .5495 | .0712 |
| .22 | .0871 | .3894 | — .3706 | .2529 | 1.0560 | .72 | .2642 | .3079 | — .1483 | .5501 | .0487 |
| .23 | .0910 | .3885 | — .3680 | .2634 | 1.0434 | .73 | .2673 | .3056 | — .1428 | .5504 | .0265 |
| .24 | .0948 | .3876 | — .3653 | .2737 | 1.0302 | .74 | .2704 | .3034 | — .1373 | .5506 | .0043 |
| .25 | .0987 | .3867 | — .3625 | .2840 | 1.0165 | .75 | .2734 | .3011 | — .1318 | .5505 | — .0176 |
| .26 | .1026 | .3857 | — .3596 | .2941 | 1.0024 | .76 | .2764 | .2989 | — .1262 | .5502 | — .0394 |
| .27 | .1064 | .3847 | — .3566 | .3040 | 0.9878 | .77 | .2794 | .2966 | — .1207 | .5497 | — .0611 |
| .28 | .1103 | .3836 | — .3535 | .3138 | 0.9727 | .78 | .2823 | .2943 | — .1153 | .5490 | — .0825 |
| .29 | .1141 | .3825 | — .3504 | .3235 | 0.9572 | .79 | .2852 | .2920 | — .1098 | .5481 | — .1037 |
| .30 | .1179 | .3814 | — .3471 | .3330 | 0.9413 | .80 | .2881 | .2897 | — .1043 | .5469 | — .1247 |
| .31 | .1217 | .3802 | — .3437 | .3423 | 0.9250 | .81 | .2910 | .2874 | — .0988 | .5456 | — .1455 |
| .32 | .1255 | .3790 | — .3402 | .3515 | 0.9082 | .82 | .2939 | .2850 | — .0934 | .5440 | — .1660 |
| .33 | .1293 | .3778 | — .3367 | .3605 | 0.8910 | .83 | .2967 | .2827 | — .0880 | .5423 | — .1862 |
| .34 | .1331 | .3765 | — .3330 | .3693 | 0.8735 | .84 | .2996 | .2803 | — .0825 | .5403 | — .2063 |
| .35 | .1368 | .3752 | — .3293 | .3779 | 0.8556 | .85 | .3023 | .2780 | — .0771 | .5381 | — .2260 |
| .36 | .1406 | .3739 | — .3255 | .3864 | 0.8373 | .86 | .3051 | .2756 | — .0718 | .5358 | — .2455 |
| .37 | .1443 | .3726 | — .3216 | .3947 | 0.8186 | .87 | .3079 | .2732 | — .0664 | .5332 | — .2646 |
| .38 | .1480 | .3712 | — .3176 | .4028 | 0.7996 | .88 | .3106 | .2709 | — .0611 | .5305 | — .2835 |
| .39 | .1517 | .3697 | — .3135 | .4107 | 0.7803 | .89 | .3133 | .2685 | — .0558 | .5276 | — .3021 |
| .40 | .1554 | .3683 | — .3094 | .4184 | 0.7607 | .90 | .3159 | .2661 | — .0506 | .5245 | — .3203 |
| .41 | .1591 | .3668 | — .3051 | .4259 | 0.7408 | .91 | .3186 | .2637 | — .0453 | .5212 | — .3383 |
| .42 | .1628 | .3653 | — .3008 | .4332 | 0.7206 | .92 | .3212 | .2613 | — .0401 | .5177 | — .3559 |
| .43 | .1664 | .3637 | — .2965 | .4403 | 0.7001 | .93 | .3238 | .2589 | — .0350 | .5140 | — .3731 |
| .44 | .1700 | .3621 | — .2920 | .4472 | 0.6793 | .94 | .3264 | .2565 | — .0299 | .5102 | — .3901 |
| .45 | .1736 | .3605 | — .2875 | .4539 | 0.6583 | .95 | .3289 | .2541 | — .0248 | .5062 | — .4066 |
| .46 | .1772 | .3589 | — .2830 | .4603 | 0.6371 | .96 | .3315 | .2516 | — .0197 | .5021 | — .4228 |
| .47 | .1808 | .3572 | — .2783 | .4666 | 0.6156 | .97 | .3340 | .2492 | — .0147 | .4978 | — .4387 |
| .48 | .1844 | .3555 | — .2736 | .4727 | 0.5940 | .98 | .3365 | .2468 | — .0098 | .4933 | — .4541 |
| .49 | .1879 | .3538 | — .2689 | .4785 | 0.5721 | .99 | .3389 | .2444 | — .0049 | .4887 | — .4692 |
| .50 | .1915 | .3521 | — .2641 | .4841 | 0.5501 | 1.00 | .3413 | .2420 | .0000 | .4839 | — .4839 |

AREAS, ORDINATES AND DERIVATIVES OF THE NORMAL CURVE OF ERROR (Continued)

| <i>t</i> | Area | Ordi- nate | Second deriva- tive | Third deriva- tive | Fourth deriva- tive | <i>t</i> | Area | Ordi- nate | Second deriva- tive | Third deriva- tive | Fourth deriva- tive |
|----------|-------|---------------|---------------------------|--------------------------|---------------------------|----------|-------|---------------|---------------------------|--------------------------|---------------------------|
| 1.00 | .3413 | .2420 | .0000 | .4839 | — .4839 | 1.50 | .4332 | .1295 | .1619 | .1457 | — .7043 |
| 1.01 | .3438 | .2396 | .0048 | .4790 | — .4983 | 1.51 | .4345 | .1276 | .1633 | .1387 | — .6994 |
| 1.02 | .3461 | .2371 | .0096 | .4740 | — .5122 | 1.52 | .4357 | .1257 | .1647 | .1317 | — .6942 |
| 1.03 | .3485 | .2347 | .0143 | .4688 | — .5257 | 1.53 | .4370 | .1238 | .1660 | .1248 | — .6888 |
| 1.04 | .3508 | .2323 | .0190 | .4635 | — .5389 | 1.54 | .4382 | .1219 | .1672 | .1180 | — .6831 |
| 1.05 | .3531 | .2299 | .0236 | .4580 | — .5516 | 1.55 | .4394 | .1200 | .1683 | .1111 | — .6772 |
| 1.06 | .3554 | .2275 | .0281 | .4524 | — .5639 | 1.56 | .4406 | .1182 | .1694 | .1044 | — .6710 |
| 1.07 | .3577 | .2251 | .0326 | .4467 | — .5758 | 1.57 | .4418 | .1163 | .1704 | .0977 | — .6646 |
| 1.08 | .3599 | .2227 | .0371 | .4409 | — .5873 | 1.58 | .4430 | .1145 | .1714 | .0911 | — .6580 |
| 1.09 | .3621 | .2203 | .0414 | .4350 | — .5984 | 1.59 | .4441 | .1127 | .1722 | .0846 | — .6511 |
| 1.10 | .3643 | .2179 | .0458 | .4290 | — .6091 | 1.60 | .4452 | .1109 | .1730 | .0781 | — .6441 |
| 1.11 | .3665 | .2155 | .0500 | .4228 | — .6193 | 1.61 | .4463 | .1092 | .1738 | .0717 | — .6368 |
| 1.12 | .3686 | .2131 | .0542 | .4166 | — .6292 | 1.62 | .4474 | .1074 | .1745 | .0654 | — .6293 |
| 1.13 | .3708 | .2107 | .0583 | .4102 | — .6386 | 1.63 | .4485 | .1057 | .1751 | .0591 | — .6216 |
| 1.14 | .3729 | .2083 | .0624 | .4038 | — .6476 | 1.64 | .4495 | .1040 | .1757 | .0529 | — .6138 |
| 1.15 | .3749 | .2059 | .0664 | .3973 | — .6561 | 1.65 | .4505 | .1023 | .1762 | .0468 | — .6057 |
| 1.16 | .3770 | .2036 | .0704 | .3907 | — .6643 | 1.66 | .4515 | .1006 | .1766 | .0408 | — .5975 |
| 1.17 | .3790 | .2012 | .0742 | .3840 | — .6720 | 1.67 | .4525 | .0989 | .1770 | .0349 | — .5891 |
| 1.18 | .3810 | .1989 | .0780 | .3772 | — .6792 | 1.68 | .4535 | .0973 | .1773 | .0290 | — .5806 |
| 1.19 | .3830 | .1965 | .0818 | .3704 | — .6861 | 1.69 | .4545 | .0957 | .1776 | .0233 | — .5720 |
| 1.20 | .3849 | .1942 | .0854 | .3635 | — .6926 | 1.70 | .4554 | .0941 | .1778 | .0176 | — .5632 |
| 1.21 | .3869 | .1919 | .0890 | .3566 | — .6986 | 1.71 | .4564 | .0925 | .1779 | .0120 | — .5542 |
| 1.22 | .3888 | .1895 | .0926 | .3496 | — .7042 | 1.72 | .4573 | .0909 | .1780 | .0065 | — .5452 |
| 1.23 | .3907 | .1872 | .0960 | .3425 | — .7094 | 1.73 | .4582 | .0893 | .1780 | .0011 | — .5360 |
| 1.24 | .3925 | .1849 | .0994 | .3354 | — .7141 | 1.74 | .4591 | .0878 | .1780 | — .0042 | — .5267 |
| 1.25 | .3944 | .1827 | .1027 | .3282 | — .7185 | 1.75 | .4599 | .0863 | .1780 | — .0094 | — .5173 |
| 1.26 | .3962 | .1804 | .1060 | .3210 | — .7224 | 1.76 | .4608 | .0848 | .1778 | — .0146 | — .5079 |
| 1.27 | .3980 | .1781 | .1092 | .3138 | — .7259 | 1.77 | .4616 | .0833 | .1777 | — .0196 | — .4983 |
| 1.28 | .3997 | .1759 | .1123 | .3065 | — .7291 | 1.78 | .4625 | .0818 | .1774 | — .0245 | — .4887 |
| 1.29 | .4015 | .1736 | .1153 | .2992 | — .7318 | 1.79 | .4633 | .0804 | .1772 | — .0294 | — .4789 |
| 1.30 | .4032 | .1714 | .1182 | .2918 | — .7341 | 1.80 | .4641 | .0790 | .1769 | — .0341 | — .4692 |
| 1.31 | .4049 | .1692 | .1211 | .2845 | — .7361 | 1.81 | .4649 | .0775 | .1765 | — .0388 | — .4593 |
| 1.32 | .4066 | .1669 | .1239 | .2771 | — .7376 | 1.82 | .4656 | .0761 | .1761 | — .0433 | — .4494 |
| 1.33 | .4082 | .1647 | .1267 | .2697 | — .7388 | 1.83 | .4664 | .0748 | .1756 | — .0477 | — .4395 |
| 1.34 | .4099 | .1626 | .1293 | .2624 | — .7395 | 1.84 | .4671 | .0734 | .1751 | — .0521 | — .4295 |
| 1.35 | .4115 | .1604 | .1319 | .2550 | — .7399 | 1.85 | .4678 | .0721 | .1746 | — .0563 | — .4195 |
| 1.36 | .4131 | .1582 | .1344 | .2476 | — .7400 | 1.86 | .4686 | .0707 | .1740 | — .0605 | — .4095 |
| 1.37 | .4147 | .1561 | .1369 | .2402 | — .7396 | 1.87 | .4693 | .0694 | .1734 | — .0645 | — .3995 |
| 1.38 | .4162 | .1540 | .1392 | .2328 | — .7389 | 1.88 | .4700 | .0681 | .1727 | — .0685 | — .3894 |
| 1.39 | .4177 | .1518 | .1415 | .2254 | — .7378 | 1.89 | .4706 | .0669 | .1720 | — .0723 | — .3793 |
| 1.40 | .4192 | .1497 | .1437 | .2180 | — .7364 | 1.90 | .4713 | .0656 | .1713 | — .0761 | — .3693 |
| 1.41 | .4207 | .1476 | .1459 | .2107 | — .7347 | 1.91 | .4719 | .0644 | .1705 | — .0797 | — .3592 |
| 1.42 | .4222 | .1456 | .1480 | .2033 | — .7326 | 1.92 | .4726 | .0632 | .1697 | — .0832 | — .3492 |
| 1.43 | .4236 | .1435 | .1500 | .1960 | — .7301 | 1.93 | .4732 | .0620 | .1688 | — .0867 | — .3392 |
| 1.44 | .4251 | .1415 | .1519 | .1887 | — .7274 | 1.94 | .4738 | .0608 | .1679 | — .0900 | — .3292 |
| 1.45 | .4265 | .1394 | .1537 | .1815 | — .7243 | 1.95 | .4744 | .0596 | .1670 | — .0933 | — .3192 |
| 1.46 | .4279 | .1374 | .1555 | .1742 | — .7209 | 1.96 | .4750 | .0584 | .1661 | — .0964 | — .3093 |
| 1.47 | .4292 | .1354 | .1572 | .1670 | — .7172 | 1.97 | .4756 | .0573 | .1651 | — .0994 | — .2994 |
| 1.48 | .4306 | .1334 | .1588 | .1599 | — .7132 | 1.98 | .4762 | .0562 | .1641 | — .1024 | — .2895 |
| 1.49 | .4319 | .1315 | .1604 | .1528 | — .7089 | 1.99 | .4767 | .0551 | .1630 | — .1052 | — .2797 |
| 1.50 | .4332 | .1295 | .1619 | .1457 | — .7043 | 2.00 | .4773 | .0540 | .1620 | — .1080 | — .2700 |

AREAS, ORDINATES AND DERIVATIVES OF THE NORMAL CURVE OF ERROR (Continued)

| <i>t</i> | Area | Ordi- nate | Second deriva- tive | Third deriva- tive | Fourth deriva- tive | <i>t</i> | Area | Ordi- nate | Second deriva- tive | Third deriva- tive | Fourth deriva- tive |
|----------|-------|---------------|---------------------------|--------------------------|---------------------------|----------|-------|---------------|---------------------------|--------------------------|---------------------------|
| 2.00 | .4773 | .0540 | .1620 | — .1080 | — .2700 | 2.50 | .4938 | .0175 | .0920 | — .1424 | .0800 |
| 2.01 | .4778 | .0529 | .1609 | — .1106 | — .2603 | 2.51 | .4940 | .0171 | .0906 | — .1416 | .0836 |
| 2.02 | .4783 | .0519 | .1598 | — .1132 | — .2506 | 2.52 | .4941 | .0167 | .0892 | — .1408 | .0871 |
| 2.03 | .4788 | .0508 | .1586 | — .1157 | — .2411 | 2.53 | .4943 | .0163 | .0878 | — .1399 | .0905 |
| 2.04 | .4793 | .0498 | .1575 | — .1180 | — .2316 | 2.54 | .4945 | .0159 | .0864 | — .1389 | .0937 |
| 2.05 | .4798 | .0488 | .1563 | — .1203 | — .2222 | 2.55 | .4946 | .0155 | .0850 | — .1380 | .0968 |
| 2.06 | .4803 | .0478 | .1550 | — .1225 | — .2129 | 2.56 | .4948 | .0151 | .0836 | — .1370 | .0998 |
| 2.07 | .4808 | .0468 | .1538 | — .1245 | — .2036 | 2.57 | .4949 | .0147 | .0823 | — .1360 | .1027 |
| 2.08 | .4812 | .0459 | .1526 | — .1265 | — .1945 | 2.58 | .4951 | .0143 | .0809 | — .1350 | .1054 |
| 2.09 | .4817 | .0449 | .1513 | — .1284 | — .1854 | 2.59 | .4952 | .0139 | .0796 | — .1339 | .1080 |
| 2.10 | .4821 | .0440 | .1500 | — .1302 | — .1765 | 2.60 | .4953 | .0136 | .0782 | — .1328 | .1105 |
| 2.11 | .4826 | .0431 | .1487 | — .1320 | — .1676 | 2.61 | .4955 | .0132 | .0769 | — .1317 | .1129 |
| 2.12 | .4830 | .0422 | .1474 | — .1336 | — .1588 | 2.62 | .4956 | .0129 | .0756 | — .1305 | .1152 |
| 2.13 | .4834 | .0413 | .1460 | — .1351 | — .1502 | 2.63 | .4957 | .0126 | .0743 | — .1294 | .1173 |
| 2.14 | .4838 | .0404 | .1446 | — .1366 | — .1416 | 2.64 | .4959 | .0122 | .0730 | — .1282 | .1194 |
| 2.15 | .4842 | .0396 | .1433 | — .1380 | — .1332 | 2.65 | .4960 | .0119 | .0717 | — .1270 | .1213 |
| 2.16 | .4846 | .0387 | .1419 | — .1393 | — .1249 | 2.66 | .4961 | .0116 | .0705 | — .1258 | .1231 |
| 2.17 | .4850 | .0379 | .1405 | — .1405 | — .1167 | 2.67 | .4962 | .0113 | .0692 | — .1245 | .1248 |
| 2.18 | .4854 | .0371 | .1391 | — .1416 | — .1086 | 2.68 | .4963 | .0110 | .0680 | — .1233 | .1264 |
| 2.19 | .4857 | .0363 | .1377 | — .1426 | — .1006 | 2.69 | .4964 | .0107 | .0668 | — .1220 | .1279 |
| 2.20 | .4861 | .0355 | .1362 | — .1436 | — .0927 | 2.70 | .4965 | .0104 | .0656 | — .1207 | .1293 |
| 2.21 | .4865 | .0347 | .1348 | — .1445 | — .0850 | 2.71 | .4966 | .0101 | .0644 | — .1194 | .1306 |
| 2.22 | .4868 | .0339 | .1333 | — .1453 | — .0774 | 2.72 | .4967 | .0099 | .0632 | — .1181 | .1317 |
| 2.23 | .4871 | .0332 | .1319 | — .1460 | — .0700 | 2.73 | .4968 | .0096 | .0620 | — .1168 | .1328 |
| 2.24 | .4875 | .0325 | .1304 | — .1467 | — .0626 | 2.74 | .4969 | .0094 | .0608 | — .1154 | .1338 |
| 2.25 | .4878 | .0317 | .1289 | — .1473 | — .0554 | 2.75 | .4970 | .0091 | .0597 | — .1141 | .1347 |
| 2.26 | .4881 | .0310 | .1275 | — .1478 | — .0484 | 2.76 | .4971 | .0089 | .0585 | — .1127 | .1356 |
| 2.27 | .4884 | .0303 | .1260 | — .1483 | — .0414 | 2.77 | .4972 | .0086 | .0574 | — .1114 | .1363 |
| 2.28 | .4887 | .0297 | .1245 | — .1486 | — .0346 | 2.78 | .4973 | .0084 | .0563 | — .1100 | .1369 |
| 2.29 | .4890 | .0290 | .1230 | — .1490 | — .0279 | 2.79 | .4974 | .0081 | .0552 | — .1087 | .1375 |
| 2.30 | .4893 | .0283 | .1215 | — .1492 | — .0214 | 2.80 | .4974 | .0079 | .0541 | — .1073 | .1379 |
| 2.31 | .4896 | .0277 | .1200 | — .1494 | — .0150 | 2.81 | .4975 | .0077 | .0531 | — .1059 | .1383 |
| 2.32 | .4898 | .0271 | .1185 | — .1495 | — .0088 | 2.82 | .4976 | .0075 | .0520 | — .1045 | .1386 |
| 2.33 | .4901 | .0264 | .1170 | — .1496 | — .0027 | 2.83 | .4977 | .0073 | .0510 | — .1031 | .1389 |
| 2.34 | .4904 | .0258 | .1155 | — .1496 | .0033 | 2.84 | .4977 | .0071 | .0500 | — .1017 | .1390 |
| 2.35 | .4906 | .0252 | .1141 | — .1495 | .0092 | 2.85 | .4978 | .0069 | .0490 | — .1003 | .1391 |
| 2.36 | .4909 | .0246 | .1126 | — .1494 | .0149 | 2.86 | .4979 | .0067 | .0480 | — .0990 | .1391 |
| 2.37 | .4911 | .0241 | .1111 | — .1492 | .0204 | 2.87 | .4980 | .0065 | .0470 | — .0976 | .1391 |
| 2.38 | .4913 | .0235 | .1096 | — .1490 | .0258 | 2.88 | .4980 | .0063 | .0460 | — .0962 | .1389 |
| 2.39 | .4916 | .0229 | .1081 | — .1487 | .0311 | 2.89 | .4981 | .0061 | .0451 | — .0948 | .1388 |
| 2.40 | .4918 | .0224 | .1066 | — .1483 | .0362 | 2.90 | .4981 | .0060 | .0441 | — .0934 | .1385 |
| 2.41 | .4920 | .0219 | .1051 | — .1480 | .0412 | 2.91 | .4982 | .0058 | .0432 | — .0920 | .1382 |
| 2.42 | .4922 | .0213 | .1036 | — .1475 | .0461 | 2.92 | .4983 | .0056 | .0423 | — .0906 | .1378 |
| 2.43 | .4925 | .0208 | .1022 | — .1470 | .0508 | 2.93 | .4983 | .0055 | .0414 | — .0893 | .1374 |
| 2.44 | .4927 | .0203 | .1007 | — .1465 | .0554 | 2.94 | .4984 | .0053 | .0405 | — .0879 | .1369 |
| 2.45 | .4929 | .0198 | .0992 | — .1459 | .0598 | 2.95 | .4984 | .0051 | .0396 | — .0865 | .1364 |
| 2.46 | .4931 | .0194 | .0978 | — .1453 | .0641 | 2.96 | .4985 | .0050 | .0388 | — .0852 | .1358 |
| 2.47 | .4932 | .0189 | .0963 | — .1446 | .0683 | 2.97 | .4985 | .0049 | .0379 | — .0838 | .1352 |
| 2.48 | .4934 | .0184 | .0949 | — .1439 | .0723 | 2.98 | .4986 | .0047 | .0371 | — .0825 | .1345 |
| 2.49 | .4936 | .0180 | .0935 | — .1432 | .0762 | 2.99 | .4986 | .0046 | .0363 | — .0811 | .1337 |
| 2.50 | .4938 | .0175 | .0920 | — .1424 | .0800 | 3.00 | .4987 | .0044 | .0355 | — .0798 | .1330 |

AREAS, ORDINATES AND DERIVATIVES OF THE NORMAL CURVE OF ERROR (Continued)

| <i>t</i> | Area | Ordinate | Second derivative | Third derivative | Fourth derivative | <i>t</i> | Area | Ordinate | Second derivative | Third derivative | Fourth derivative |
|----------|-------|----------|-------------------|------------------|-------------------|----------|-------|----------|-------------------|------------------|-------------------|
| 3.00 | .4987 | .0044 | .0355 | -.0798 | .1330 | 3.50 | .4998 | .0009 | .0098 | -.0283 | .0694 |
| 3.01 | .4987 | .0043 | .0347 | -.0785 | .1321 | 3.51 | .4998 | .0008 | .0095 | -.0276 | .0681 |
| 3.02 | .4987 | .0042 | .0339 | -.0771 | .1313 | 3.52 | .4998 | .0008 | .0093 | -.0269 | .0669 |
| 3.03 | .4988 | .0041 | .0331 | -.0758 | .1304 | 3.53 | .4998 | .0008 | .0090 | -.0262 | .0656 |
| 3.04 | .4988 | .0039 | .0324 | -.0745 | .1294 | 3.54 | .4998 | .0008 | .0087 | -.0256 | .0643 |
| 3.05 | .4989 | .0038 | .0316 | -.0732 | .1285 | 3.55 | .4998 | .0007 | .0085 | -.0249 | .0631 |
| 3.06 | .4989 | .0037 | .0309 | -.0720 | .1275 | 3.56 | .4998 | .0007 | .0082 | -.0243 | .0618 |
| 3.07 | .4989 | .0036 | .0302 | -.0707 | .1264 | 3.57 | .4998 | .0007 | .0080 | -.0237 | .0606 |
| 3.08 | .4990 | .0035 | .0295 | -.0694 | .1254 | 3.58 | .4998 | .0007 | .0078 | -.0231 | .0594 |
| 3.09 | .4990 | .0034 | .0288 | -.0682 | .1243 | 3.59 | .4998 | .0006 | .0075 | -.0225 | .0582 |
| 3.10 | .4990 | .0033 | .0281 | -.0669 | .1231 | 3.60 | .4998 | .0006 | .0073 | -.0219 | .0570 |
| 3.11 | .4991 | .0032 | .0275 | -.0657 | .1220 | 3.61 | .4999 | .0006 | .0071 | -.0214 | .0559 |
| 3.12 | .4991 | .0031 | .0268 | -.0645 | .1208 | 3.62 | .4999 | .0006 | .0069 | -.0208 | .0547 |
| 3.13 | .4991 | .0030 | .0262 | -.0633 | .1196 | 3.63 | .4999 | .0006 | .0067 | -.0203 | .0536 |
| 3.14 | .4992 | .0029 | .0256 | -.0621 | .1184 | 3.64 | .4999 | .0005 | .0065 | -.0198 | .0524 |
| 3.15 | .4992 | .0028 | .0249 | -.0609 | .1171 | 3.65 | .4999 | .0005 | .0063 | -.0192 | .0513 |
| 3.16 | .4992 | .0027 | .0243 | -.0598 | .1159 | 3.66 | .4999 | .0005 | .0061 | -.0187 | .0502 |
| 3.17 | .4992 | .0026 | .0237 | -.0586 | .1146 | 3.67 | .4999 | .0005 | .0059 | -.0182 | .0492 |
| 3.18 | .4993 | .0025 | .0232 | -.0575 | .1133 | 3.68 | .4999 | .0005 | .0057 | -.0177 | .0481 |
| 3.19 | .4993 | .0025 | .0226 | -.0564 | .1120 | 3.69 | .4999 | .0004 | .0056 | -.0173 | .0470 |
| 3.20 | .4993 | .0024 | .0220 | -.0552 | .1107 | 3.70 | .4999 | .0004 | .0054 | -.0168 | .0460 |
| 3.21 | .4993 | .0023 | .0215 | -.0541 | .1093 | 3.71 | .4999 | .0004 | .0052 | -.0164 | .0450 |
| 3.22 | .4994 | .0022 | .0210 | -.0531 | .1080 | 3.72 | .4999 | .0004 | .0051 | -.0159 | .0440 |
| 3.23 | .4994 | .0022 | .0204 | -.0520 | .1066 | 3.73 | .4999 | .0004 | .0049 | -.0155 | .0430 |
| 3.24 | .4994 | .0021 | .0199 | -.0509 | .1053 | 3.74 | .4999 | .0004 | .0048 | -.0150 | .0420 |
| 3.25 | .4994 | .0020 | .0194 | -.0499 | .1039 | 3.75 | .4999 | .0004 | .0046 | -.0146 | .0410 |
| 3.26 | .4994 | .0020 | .0189 | -.0488 | .1025 | 3.76 | .4999 | .0003 | .0045 | -.0142 | .0401 |
| 3.27 | .4995 | .0019 | .0184 | -.0478 | .1011 | 3.77 | .4999 | .0003 | .0043 | -.0138 | .0392 |
| 3.28 | .4995 | .0018 | .0180 | -.0468 | .0997 | 3.78 | .4999 | .0003 | .0042 | -.0134 | .0382 |
| 3.29 | .4995 | .0018 | .0175 | -.0458 | .0983 | 3.79 | .4999 | .0003 | .0041 | -.0131 | .0373 |
| 3.30 | .4995 | .0017 | .0170 | -.0449 | .0969 | 3.80 | .4999 | .0003 | .0039 | -.0127 | .0365 |
| 3.31 | .4995 | .0017 | .0166 | -.0439 | .0955 | 3.81 | .4999 | .0003 | .0038 | -.0123 | .0356 |
| 3.32 | .4996 | .0016 | .0162 | -.0429 | .0941 | 3.82 | .4999 | .0003 | .0037 | -.0120 | .0347 |
| 3.33 | .4996 | .0016 | .0157 | -.0420 | .0927 | 3.83 | .4999 | .0003 | .0036 | -.0116 | .0339 |
| 3.34 | .4996 | .0015 | .0153 | -.0411 | .0913 | 3.84 | .4999 | .0003 | .0034 | -.0113 | .0331 |
| 3.35 | .4996 | .0015 | .0149 | -.0402 | .0899 | 3.85 | .4999 | .0002 | .0033 | -.0110 | .0323 |
| 3.36 | .4996 | .0014 | .0145 | -.0393 | .0885 | 3.86 | .4999 | .0002 | .0032 | -.0107 | .0315 |
| 3.37 | .4996 | .0014 | .0141 | -.0384 | .0871 | 3.87 | .5000 | .0002 | .0031 | -.0104 | .0307 |
| 3.38 | .4996 | .0013 | .0138 | -.0376 | .0857 | 3.88 | .5000 | .0002 | .0030 | -.0100 | .0299 |
| 3.39 | .4997 | .0013 | .0134 | -.0367 | .0843 | 3.89 | .5000 | .0002 | .0029 | -.0098 | .0292 |
| 3.40 | .4997 | .0012 | .0130 | -.0359 | .0829 | 3.90 | .5000 | .0002 | .0028 | -.0095 | .0284 |
| 3.41 | .4997 | .0012 | .0127 | -.0350 | .0815 | 3.91 | .5000 | .0002 | .0027 | -.0092 | .0277 |
| 3.42 | .4997 | .0012 | .0123 | -.0342 | .0801 | 3.92 | .5000 | .0002 | .0026 | -.0089 | .0270 |
| 3.43 | .4997 | .0011 | .0120 | -.0334 | .0788 | 3.93 | .5000 | .0002 | .0026 | -.0086 | .0263 |
| 3.44 | .4997 | .0011 | .0116 | -.0327 | .0774 | 3.94 | .5000 | .0002 | .0025 | -.0084 | .0256 |
| 3.45 | .4997 | .0010 | .0113 | -.0319 | .0761 | 3.95 | .5000 | .0002 | .0024 | -.0081 | .0250 |
| 3.46 | .4997 | .0010 | .0110 | -.0311 | .0747 | 3.96 | .5000 | .0002 | .0023 | -.0079 | .0243 |
| 3.47 | .4997 | .0010 | .0107 | -.0304 | .0734 | 3.97 | .5000 | .0002 | .0022 | -.0076 | .0237 |
| 3.48 | .4998 | .0009 | .0104 | -.0297 | .0721 | 3.98 | .5000 | .0001 | .0022 | -.0074 | .0230 |
| 3.49 | .4998 | .0009 | .0101 | -.0290 | .0707 | 3.99 | .5000 | .0001 | .0021 | -.0072 | .0224 |
| 3.50 | .4998 | .0009 | .0098 | -.0283 | .0694 | 4.00 | .5000 | .0001 | .0020 | -.0070 | .0218 |

AREAS, ORDINATES AND DERIVATIVES OF THE NORMAL CURVE OF ERROR (Continued)

| <i>t</i> | Area | Ordi- nate | Second deriva- tive | Third deriva- tive | Fourth deriva- tive | <i>t</i> | Area | Ordi- nate | Second deriva- tive | Third deriva- tive | Fourth deriva- tive |
|----------|-------|---------------|---------------------------|--------------------------|---------------------------|----------|-------|---------------|---------------------------|--------------------------|---------------------------|
| 4.00 | .5000 | .0001 | .0020 | -.0070 | .0218 | 4.50 | .5000 | .0000 | .0003 | -.0012 | .0047 |
| 4.01 | .5000 | .0001 | .0019 | -.0067 | .0212 | 4.51 | .5000 | .0000 | .0003 | -.0012 | .0045 |
| 4.02 | .5000 | .0001 | .0019 | -.0065 | .0207 | 4.52 | .5000 | .0000 | .0003 | -.0012 | .0044 |
| 4.03 | .5000 | .0001 | .0018 | -.0063 | .0201 | 4.53 | .5000 | .0000 | .0003 | -.0011 | .0042 |
| 4.04 | .5000 | .0001 | .0018 | -.0061 | .0195 | 4.54 | .5000 | .0000 | .0003 | -.0011 | .0041 |
| 4.05 | .5000 | .0001 | .0017 | -.0059 | .0190 | 4.55 | .5000 | .0000 | .0003 | -.0010 | .0039 |
| 4.06 | .5000 | .0001 | .0016 | -.0058 | .0185 | 4.56 | .5000 | .0000 | .0002 | -.0010 | .0038 |
| 4.07 | .5000 | .0001 | .0016 | -.0056 | .0180 | 4.57 | .5000 | .0000 | .0002 | -.0010 | .0037 |
| 4.08 | .5000 | .0001 | .0015 | -.0054 | .0175 | 4.58 | .5000 | .0000 | .0002 | -.0009 | .0035 |
| 4.09 | .5000 | .0001 | .0015 | -.0052 | .0170 | 4.59 | .5000 | .0000 | .0002 | -.0009 | .0034 |
| 4.10 | .5000 | .0001 | .0014 | -.0051 | .0165 | 4.60 | .5000 | .0000 | .0002 | -.0009 | .0033 |
| 4.11 | .5000 | .0001 | .0014 | -.0049 | .0160 | 4.61 | .5000 | .0000 | .0002 | -.0008 | .0032 |
| 4.12 | .5000 | .0001 | .0013 | -.0047 | .0156 | 4.62 | .5000 | .0000 | .0002 | -.0008 | .0031 |
| 4.13 | .5000 | .0001 | .0013 | -.0046 | .0151 | 4.63 | .5000 | .0000 | .0002 | -.0008 | .0030 |
| 4.14 | .5000 | .0001 | .0012 | -.0044 | .0147 | 4.64 | .5000 | .0000 | .0002 | -.0007 | .0028 |
| 4.15 | .5000 | .0001 | .0012 | -.0043 | .0143 | 4.65 | .5000 | .0000 | .0002 | -.0007 | .0027 |
| 4.16 | .5000 | .0001 | .0011 | -.0042 | .0138 | 4.66 | .5000 | .0000 | .0002 | -.0007 | .0026 |
| 4.17 | .5000 | .0001 | .0011 | -.0040 | .0134 | 4.67 | .5000 | .0000 | .0002 | -.0006 | .0026 |
| 4.18 | .5000 | .0001 | .0011 | -.0039 | .0130 | 4.68 | .5000 | .0000 | .0002 | -.0006 | .0025 |
| 4.19 | .5000 | .0001 | .0010 | -.0038 | .0127 | 4.69 | .5000 | .0000 | .0001 | -.0006 | .0024 |
| 4.20 | .5000 | .0001 | .0010 | -.0036 | .0123 | 4.70 | .5000 | .0000 | .0001 | -.0006 | .0023 |
| 4.21 | .5000 | .0001 | .0009 | -.0035 | .0119 | 4.71 | .5000 | .0000 | .0001 | -.0006 | .0022 |
| 4.22 | .5000 | .0001 | .0009 | -.0034 | .0116 | 4.72 | .5000 | .0000 | .0001 | -.0005 | .0021 |
| 4.23 | .5000 | .0001 | .0009 | -.0033 | .0112 | 4.73 | .5000 | .0000 | .0001 | -.0005 | .0020 |
| 4.24 | .5000 | .0001 | .0009 | -.0032 | .0109 | 4.74 | .5000 | .0000 | .0001 | -.0005 | .0020 |
| 4.25 | .5000 | .0001 | .0008 | -.0031 | .0105 | 4.75 | .5000 | .0000 | .0001 | -.0005 | .0019 |
| 4.26 | .5000 | .0001 | .0008 | -.0030 | .0102 | 4.76 | .5000 | .0000 | .0001 | -.0005 | .0018 |
| 4.27 | .5000 | .0000 | .0008 | -.0029 | .0099 | 4.77 | .5000 | .0000 | .0001 | -.0004 | .0018 |
| 4.28 | .5000 | .0000 | .0007 | -.0028 | .0096 | 4.78 | .5000 | .0000 | .0001 | -.0004 | .0017 |
| 4.29 | .5000 | .0000 | .0007 | -.0027 | .0093 | 4.79 | .5000 | .0000 | .0001 | -.0004 | .0016 |
| 4.30 | .5000 | .0000 | .0007 | -.0026 | .0090 | 4.80 | .5000 | .0000 | .0001 | -.0004 | .0016 |
| 4.31 | .5000 | .0000 | .0007 | -.0025 | .0087 | 4.81 | .5000 | .0000 | .0001 | -.0004 | .0015 |
| 4.32 | .5000 | .0000 | .0006 | -.0024 | .0085 | 4.82 | .5000 | .0000 | .0001 | -.0004 | .0015 |
| 4.33 | .5000 | .0000 | .0006 | -.0023 | .0082 | 4.83 | .5000 | .0000 | .0001 | -.0003 | .0014 |
| 4.34 | .5000 | .0000 | .0006 | -.0022 | .0079 | 4.84 | .5000 | .0000 | .0001 | -.0003 | .0013 |
| 4.35 | .5000 | .0000 | .0006 | -.0022 | .0077 | 4.85 | .5000 | .0000 | .0001 | -.0003 | .0013 |
| 4.36 | .5000 | .0000 | .0005 | -.0021 | .0074 | 4.86 | .5000 | .0000 | .0001 | -.0003 | .0012 |
| 4.37 | .5000 | .0000 | .0005 | -.0020 | .0072 | 4.87 | .5000 | .0000 | .0001 | -.0003 | .0012 |
| 4.38 | .5000 | .0000 | .0005 | -.0019 | .0070 | 4.88 | .5000 | .0000 | .0001 | -.0003 | .0012 |
| 4.39 | .5000 | .0000 | .0005 | -.0019 | .0067 | 4.89 | .5000 | .0000 | .0001 | -.0003 | .0011 |
| 4.40 | .5000 | .0000 | .0005 | -.0018 | .0065 | 4.90 | .5000 | .0000 | .0001 | -.0003 | .0011 |
| 4.41 | .5000 | .0000 | .0004 | -.0017 | .0063 | 4.91 | .5000 | .0000 | .0001 | -.0002 | .0010 |
| 4.42 | .5000 | .0000 | .0004 | -.0017 | .0061 | 4.92 | .5000 | .0000 | .0001 | -.0002 | .0010 |
| 4.43 | .5000 | .0000 | .0004 | -.0016 | .0059 | 4.93 | .5000 | .0000 | .0001 | -.0002 | .0009 |
| 4.44 | .5000 | .0000 | .0004 | -.0016 | .0057 | 4.94 | .5000 | .0000 | .0001 | -.0002 | .0009 |
| 4.45 | .5000 | .0000 | .0004 | -.0015 | .0055 | 4.95 | .5000 | .0000 | .0000 | -.0002 | .0009 |
| 4.46 | .5000 | .0000 | .0004 | -.0014 | .0053 | 4.96 | .5000 | .0000 | .0000 | -.0002 | .0008 |
| 4.47 | .5000 | .0000 | .0004 | -.0014 | .0052 | 4.97 | .5000 | .0000 | .0000 | -.0002 | .0008 |
| 4.48 | .5000 | .0000 | .0003 | -.0013 | .0050 | 4.98 | .5000 | .0000 | .0000 | -.0002 | .0008 |
| 4.49 | .5000 | .0000 | .0003 | -.0013 | .0048 | 4.99 | .5000 | .0000 | .0000 | -.0002 | .0007 |
| 4.50 | .5000 | .0000 | .0003 | -.0012 | .0047 | | | | | | |

COMPLETE ELLIPTIC INTEGRALS

$$K = \int_0^{\pi/2} \frac{d\phi}{\sqrt{1 - k^2 \sin^2 \phi}} \quad E = \int_0^{\pi/2} \sqrt{1 - k^2 \sin^2 \phi} \cdot d\phi.$$

| $\sin^{-1} k$ | K | $\log K$ | $\sin^{-1} k$ | K | $\log K$ |
|---------------|--------|----------|---------------|--------|----------|
| 0° | 1.5708 | 0.196120 | 40° | 1.7868 | 0.252068 |
| 1 | 1.5709 | 0.196153 | 41 | 1.7992 | 0.255085 |
| 2 | 1.5713 | 0.196252 | 42 | 1.8122 | 0.258197 |
| 3 | 1.5719 | 0.196418 | 43 | 1.8256 | 0.261406 |
| 4 | 1.5727 | 0.196649 | 44 | 1.8396 | 0.264716 |
| 5 | 1.5738 | 0.196947 | 45 | 1.8541 | 0.268127 |
| 6 | 1.5751 | 0.197312 | 46 | 1.8691 | 0.271644 |
| 7 | 1.5767 | 0.197743 | 47 | 1.8848 | 0.275267 |
| 8 | 1.5785 | 0.198241 | 48 | 1.9011 | 0.279001 |
| 9 | 1.5805 | 0.198806 | 49 | 1.9180 | 0.282848 |
| 10 | 1.5828 | 0.199438 | 50 | 1.9356 | 0.286811 |
| 11 | 1.5854 | 0.200137 | 51 | 1.9539 | 0.290895 |
| 12 | 1.5882 | 0.200904 | 52 | 1.9729 | 0.295101 |
| 13 | 1.5913 | 0.201740 | 53 | 1.9927 | 0.299435 |
| 14 | 1.5946 | 0.202643 | 54 | 2.0133 | 0.303901 |
| 15 | 1.5981 | 0.203615 | 55 | 2.0347 | 0.308504 |
| 16 | 1.6020 | 0.204657 | 56 | 2.0571 | 0.313247 |
| 17 | 1.6061 | 0.205768 | 57 | 2.0804 | 0.318138 |
| 18 | 1.6105 | 0.206948 | 58 | 2.1047 | 0.323182 |
| 19 | 1.6151 | 0.208200 | 59 | 2.1300 | 0.328384 |
| 20 | 1.6200 | 0.209522 | 60 | 2.1565 | 0.333753 |
| 21 | 1.6252 | 0.210916 | 61 | 2.1842 | 0.339295 |
| 22 | 1.6307 | 0.212382 | 62 | 2.2132 | 0.345020 |
| 23 | 1.6365 | 0.213921 | 63 | 2.2435 | 0.350936 |
| 24 | 1.6426 | 0.215533 | 64 | 2.2754 | 0.357053 |
| 25 | 1.6490 | 0.217219 | 65 | 2.3088 | 0.363384 |
| 26 | 1.6557 | 0.218981 | 66 | 2.3439 | 0.369940 |
| 27 | 1.6627 | 0.220818 | 67 | 2.3809 | 0.376736 |
| 28 | 1.6701 | 0.222732 | 68 | 2.4198 | 0.383787 |
| 29 | 1.6777 | 0.224723 | 69 | 2.4610 | 0.391112 |
| 30 | 1.6858 | 0.226793 | 70 | 2.5046 | 0.398730 |
| 31 | 1.6941 | 0.228943 | 71 | 2.5507 | 0.406665 |
| 32 | 1.7028 | 0.231173 | 72 | 2.5998 | 0.414943 |
| 33 | 1.7119 | 0.233485 | 73 | 2.6521 | 0.423596 |
| 34 | 1.7214 | 0.235880 | 74 | 2.7081 | 0.432660 |
| 35 | 1.7312 | 0.238359 | 75 | 2.7681 | 0.442176 |
| 36 | 1.7415 | 0.240923 | 76 | 2.8327 | 0.452196 |
| 37 | 1.7522 | 0.243575 | 77 | 2.9026 | 0.462782 |
| 38 | 1.7633 | 0.246315 | 78 | 2.9786 | 0.474008 |
| 39 | 1.7748 | 0.249146 | 79 | 3.0617 | 0.485967 |
| 40 | 1.7868 | 0.252068 | 80 | 3.1534 | 0.498777 |

COMPLETE ELLIPTIC INTEGRALS (Continued)

| $\sin^{-1} k$ | K | $\log K$ | $\sin^{-1} k$ | K | $\log K$ |
|---------------|--------|----------|---------------|----------|----------|
| 80° | 3.1534 | 0.498777 | 85° | 3.8317 | 0.583396 |
| 81 | 3.2553 | 0.512591 | 86 | 4.0528 | 0.607751 |
| 82 | 3.3699 | 0.527613 | 87 | 4.3387 | 0.637355 |
| 83 | 3.5004 | 0.544120 | 88 | 4.7427 | 0.676027 |
| 84 | 3.6519 | 0.562514 | 89 | 5.4349 | 0.735192 |
| 85 | 3.8317 | 0.583396 | 90 | ∞ | ∞ |

Values of K for $\sin^{-1} k = 85^\circ$ to 89° by 0.1° and 89° to 90° by minutes.

| $\sin^{-1} k$ | K | $\log K$ | $\sin^{-1} k$ | K | $\log K$ |
|---------------|-------|----------|---------------|----------|----------|
| 85.0° | 3.832 | 0.58343 | 89° 0' | 5.435 | 0.73520 |
| 85.1 | 3.852 | 0.58569 | 89 2 | 5.469 | 0.73791 |
| 85.2 | 3.872 | 0.58794 | 89 4 | 5.504 | 0.74068 |
| 85.3 | 3.893 | 0.59028 | 89 6 | 5.540 | 0.74351 |
| 85.4 | 3.914 | 0.59262 | 89 8 | 5.578 | 0.74648 |
| 85.5 | 3.936 | 0.59506 | 89 10 | 5.617 | 0.74950 |
| 85.6 | 3.958 | 0.59748 | 89 12 | 5.658 | 0.75266 |
| 85.7 | 3.981 | 0.59999 | 89 14 | 5.700 | 0.75587 |
| 85.8 | 4.004 | 0.60249 | 89 16 | 5.745 | 0.75929 |
| 85.9 | 4.028 | 0.60509 | 89 18 | 5.791 | 0.76275 |
| 86.0 | 4.053 | 0.60778 | 89 20 | 5.840 | 0.76641 |
| 86.1 | 4.078 | 0.61045 | 89 22 | 5.891 | 0.77019 |
| 86.2 | 4.104 | 0.61321 | 89 24 | 5.946 | 0.77422 |
| 86.3 | 4.130 | 0.61595 | 89 26 | 6.003 | 0.77837 |
| 86.4 | 4.157 | 0.61878 | 89 28 | 6.063 | 0.78269 |
| 86.5 | 4.185 | 0.62170 | 89 30 | 6.128 | 0.78732 |
| 86.6 | 4.214 | 0.62469 | 89 32 | 6.197 | 0.79218 |
| 86.7 | 4.244 | 0.62778 | 89 34 | 6.271 | 0.79734 |
| 86.8 | 4.274 | 0.63083 | 89 36 | 6.351 | 0.80284 |
| 86.9 | 4.306 | 0.63407 | 89 38 | 6.438 | 0.80875 |
| 87.0 | 4.339 | 0.63739 | 89 40 | 6.533 | 0.81511 |
| 87.1 | 4.372 | 0.64068 | 89 41 | 6.584 | 0.81849 |
| 87.2 | 4.407 | 0.64414 | 89 42 | 6.639 | 0.82210 |
| 87.3 | 4.444 | 0.64777 | 89 43 | 6.696 | 0.82582 |
| 87.4 | 4.481 | 0.65137 | 89 44 | 6.756 | 0.82969 |
| 87.5 | 4.520 | 0.65514 | 89 45 | 6.821 | 0.83385 |
| 87.6 | 4.562 | 0.65916 | 89 46 | 6.890 | 0.83822 |
| 87.7 | 4.603 | 0.66304 | 89 47 | 6.964 | 0.84286 |
| 87.8 | 4.648 | 0.66727 | 89 48 | 7.044 | 0.84782 |
| 87.9 | 4.694 | 0.67154 | 89 49 | 7.131 | 0.85315 |
| 88.0 | 4.743 | 0.67605 | 89 50 | 7.226 | 0.85890 |
| 88.1 | 4.794 | 0.68070 | 89 51 | 7.332 | 0.86522 |
| 88.2 | 4.848 | 0.68556 | 89 52 | 7.449 | 0.87210 |
| 88.3 | 4.905 | 0.69064 | 89 53 | 7.583 | 0.87984 |
| 88.4 | 4.965 | 0.69592 | 89 54 | 7.737 | 0.88857 |
| 88.5 | 5.030 | 0.70157 | 89 55 | 7.919 | 0.89867 |
| 88.6 | 5.099 | 0.70749 | 89 56 | 8.143 | 0.91078 |
| 88.7 | 5.173 | 0.71374 | 89 57 | 8.430 | 0.92583 |
| 88.8 | 5.253 | 0.72041 | 89 58 | 8.836 | 0.94626 |
| 88.9 | 5.340 | 0.72754 | 89 59 | 9.529 | 0.97905 |
| 89.0 | 5.435 | 0.73520 | 90 0 | ∞ | ∞ |

COMPLETE ELLIPTIC INTEGRALS (Continued)

| $\sin^{-1} k$ | E | $\log E$ | $\sin^{-1} k$ | E | $\log E$ |
|---------------|--------|----------|---------------|--------|----------|
| 0° | 1.5708 | 0.196120 | 45° | 1.3506 | 0.130541 |
| 1 | 1.5707 | 0.196087 | 46 | 1.3418 | 0.127690 |
| 2 | 1.5703 | 0.195988 | 47 | 1.3329 | 0.124788 |
| 3 | 1.5697 | 0.195822 | 48 | 1.3238 | 0.121836 |
| 4 | 1.5689 | 0.195591 | 49 | 1.3147 | 0.118836 |
| 5 | 1.5678 | 0.195293 | 50 | 1.3055 | 0.115790 |
| 6 | 1.5665 | 0.194930 | 51 | 1.2963 | 0.112698 |
| 7 | 1.5649 | 0.194500 | 52 | 1.2870 | 0.109563 |
| 8 | 1.5632 | 0.194004 | 53 | 1.2776 | 0.106386 |
| 9 | 1.5611 | 0.193442 | 54 | 1.2681 | 0.103169 |
| 10 | 1.5589 | 0.192815 | 55 | 1.2587 | 0.099915 |
| 11 | 1.5564 | 0.192121 | 56 | 1.2492 | 0.096626 |
| 12 | 1.5537 | 0.191362 | 57 | 1.2397 | 0.093303 |
| 13 | 1.5507 | 0.190537 | 58 | 1.2301 | 0.089950 |
| 14 | 1.5476 | 0.189646 | 59 | 1.2206 | 0.086569 |
| 15 | 1.5442 | 0.188690 | 60 | 1.2111 | 0.083164 |
| 16 | 1.5405 | 0.187668 | 61 | 1.2015 | 0.079738 |
| 17 | 1.5367 | 0.186581 | 62 | 1.1920 | 0.076293 |
| 18 | 1.5326 | 0.185428 | 63 | 1.1826 | 0.072834 |
| 19 | 1.5283 | 0.184210 | 64 | 1.1732 | 0.069364 |
| 20 | 1.5238 | 0.182928 | 65 | 1.1638 | 0.065889 |
| 21 | 1.5191 | 0.181580 | 66 | 1.1545 | 0.062412 |
| 22 | 1.5141 | 0.180168 | 67 | 1.1453 | 0.058937 |
| 23 | 1.5090 | 0.178691 | 68 | 1.1362 | 0.055472 |
| 24 | 1.5037 | 0.177150 | 69 | 1.1272 | 0.052020 |
| 25 | 1.4981 | 0.175545 | 70 | 1.1184 | 0.048589 |
| 26 | 1.4924 | 0.173876 | 71 | 1.1096 | 0.045183 |
| 27 | 1.4864 | 0.172144 | 72 | 1.1011 | 0.041812 |
| 28 | 1.4803 | 0.170348 | 73 | 1.0927 | 0.038481 |
| 29 | 1.4740 | 0.168489 | 74 | 1.0844 | 0.035200 |
| 30 | 1.4675 | 0.166567 | 75 | 1.0764 | 0.031976 |
| 31 | 1.4608 | 0.164583 | 76 | 1.0686 | 0.028819 |
| 32 | 1.4539 | 0.162537 | 77 | 1.0611 | 0.025740 |
| 33 | 1.4469 | 0.160429 | 78 | 1.0538 | 0.022749 |
| 34 | 1.4397 | 0.158261 | 79 | 1.0468 | 0.019858 |
| 35 | 1.4323 | 0.156031 | 80 | 1.0401 | 0.017081 |
| 36 | 1.4248 | 0.153742 | 81 | 1.0338 | 0.014432 |
| 37 | 1.4171 | 0.151393 | 82 | 1.0278 | 0.011927 |
| 38 | 1.4092 | 0.148985 | 83 | 1.0223 | 0.009584 |
| 39 | 1.4013 | 0.146519 | 84 | 1.0172 | 0.007422 |
| 40 | 1.3931 | 0.143995 | 85 | 1.0127 | 0.005465 |
| 41 | 1.3849 | 0.141414 | 86 | 1.0086 | 0.003740 |
| 42 | 1.3765 | 0.138778 | 87 | 1.0053 | 0.002278 |
| 43 | 1.3680 | 0.136086 | 88 | 1.0026 | 0.001121 |
| 44 | 1.3594 | 0.133340 | 89 | 1.0008 | 0.000326 |
| 45 | 1.3506 | 0.130541 | 90 | 1.0000 | 0.000000 |

FACTORS AND PRIMES

If n is prime the mantissa of its logarithm is given.

| n | 0 | 1 | 2 | 3 | 4 |
|-----------|-------------------------------|----------------------|------------------------------|----------------------|-------------------------|
| 0 | | 0000000 | 3010300 | 4771213 | 2^2 |
| 1 | $2 \cdot 5$ | 0413927 | $2^2 \cdot 3$ | 1139434 | $2 \cdot 7$ |
| 2 | $2^2 \cdot 5$ | $3 \cdot 7$ | $2 \cdot 11$ | 3617278 | $2^3 \cdot 3$ |
| 3 | $2 \cdot 3 \cdot 5$ | 4913617 | 2^5 | $3 \cdot 11$ | $2 \cdot 17$ |
| 4 | $2^3 \cdot 5$ | 6127839 | $2 \cdot 3 \cdot 7$ | 6334685 | $2^2 \cdot 11$ |
| 5 | $2 \cdot 5^2$ | $3 \cdot 17$ | $2^2 \cdot 13$ | 7242759 | $2 \cdot 3^3$ |
| 6 | $2^2 \cdot 3 \cdot 5$ | 7853298 | $2 \cdot 31$ | $3^2 \cdot 7$ | 2^6 |
| 7 | $2 \cdot 5 \cdot 7$ | 8512583 | $2^3 \cdot 3^2$ | 8633229 | $2 \cdot 37$ |
| 8 | $2^4 \cdot 5$ | 3^4 | $2 \cdot 41$ | 9190781 | $2^2 \cdot 3 \cdot 7$ |
| 9 | $2 \cdot 3^2 \cdot 5$ | $7 \cdot 13$ | $2^2 \cdot 23$ | $3 \cdot 31$ | $2 \cdot 47$ |
| 10 | $2^2 \cdot 5^2$ | 0043214 | $2 \cdot 3 \cdot 17$ | 0128372 | $2^3 \cdot 13$ |
| 11 | $2 \cdot 5 \cdot 11$ | $3 \cdot 37$ | $2^4 \cdot 7$ | 0530784 | $2 \cdot 3 \cdot 19$ |
| 12 | $2^3 \cdot 3 \cdot 5$ | 11^2 | $2 \cdot 61$ | $3 \cdot 41$ | $2^2 \cdot 31$ |
| 13 | $2 \cdot 5 \cdot 13$ | 1172713 | $2^2 \cdot 3 \cdot 11$ | $7 \cdot 19$ | $2 \cdot 67$ |
| 14 | $2^2 \cdot 5 \cdot 7$ | $3 \cdot 47$ | $2 \cdot 71$ | $11 \cdot 13$ | $2^4 \cdot 3^2$ |
| 15 | $2 \cdot 3 \cdot 5^2$ | 1789769 | $2^3 \cdot 19$ | $3^2 \cdot 17$ | $2 \cdot 7 \cdot 11$ |
| 16 | $2^5 \cdot 5$ | $7 \cdot 23$ | $2 \cdot 3^4$ | 2121876 | $2^2 \cdot 41$ |
| 17 | $2 \cdot 5 \cdot 17$ | $3^2 \cdot 19$ | $2^2 \cdot 43$ | 2380461 | $2 \cdot 3 \cdot 29$ |
| 18 | $2^2 \cdot 3^2 \cdot 5$ | 2576786 | $2 \cdot 7 \cdot 13$ | $3 \cdot 61$ | $2^3 \cdot 23$ |
| 19 | $2 \cdot 5 \cdot 19$ | 2810334 | $2^6 \cdot 3$ | 2855573 | $2 \cdot 97$ |
| 20 | $2^3 \cdot 5^2$ | $3 \cdot 67$ | $2 \cdot 101$ | $7 \cdot 29$ | $2^2 \cdot 3 \cdot 17$ |
| 21 | $2 \cdot 3 \cdot 5 \cdot 7$ | 3242825 | $2^2 \cdot 53$ | $3 \cdot 71$ | $2 \cdot 107$ |
| 22 | $2^2 \cdot 5 \cdot 11$ | $13 \cdot 17$ | $2 \cdot 3 \cdot 37$ | 3483049 | $2^5 \cdot 7$ |
| 23 | $2 \cdot 5 \cdot 23$ | $3 \cdot 7 \cdot 11$ | $2^3 \cdot 29$ | 3673559 | $2 \cdot 3^2 \cdot 13$ |
| 24 | $2^4 \cdot 3 \cdot 5$ | 3820170 | $2 \cdot 11^2$ | 3^5 | $2^2 \cdot 61$ |
| 25 | $2 \cdot 5^3$ | 3996737 | $2^2 \cdot 3^2 \cdot 7$ | $11 \cdot 23$ | $2 \cdot 127$ |
| 26 | $2^2 \cdot 5 \cdot 13$ | $3^2 \cdot 29$ | $2 \cdot 131$ | 4199557 | $2^3 \cdot 3 \cdot 11$ |
| 27 | $2 \cdot 3^3 \cdot 5$ | 4329693 | $2^4 \cdot 17$ | $3 \cdot 7 \cdot 13$ | $2 \cdot 137$ |
| 28 | $2^3 \cdot 5 \cdot 7$ | 4487063 | $2 \cdot 3 \cdot 47$ | 4517864 | $2^2 \cdot 71$ |
| 29 | $2 \cdot 5 \cdot 29$ | $3 \cdot 97$ | $2^2 \cdot 73$ | 4668676 | $2 \cdot 3 \cdot 7^2$ |
| 30 | $2^2 \cdot 3 \cdot 5^2$ | $7 \cdot 43$ | $2 \cdot 151$ | $3 \cdot 101$ | $2^4 \cdot 19$ |
| 31 | $2 \cdot 5 \cdot 31$ | 4927604 | $2^3 \cdot 3 \cdot 13$ | 4955443 | $2 \cdot 157$ |
| 32 | $2^6 \cdot 5$ | $3 \cdot 107$ | $2 \cdot 7 \cdot 23$ | $17 \cdot 19$ | $2^2 \cdot 3^4$ |
| 33 | $2 \cdot 3 \cdot 5 \cdot 11$ | 5198280 | $2^2 \cdot 83$ | $3^2 \cdot 37$ | $2 \cdot 167$ |
| 34 | $2^2 \cdot 5 \cdot 17$ | $11 \cdot 31$ | $2 \cdot 3^2 \cdot 19$ | 7^3 | $2^3 \cdot 43$ |
| 35 | $2 \cdot 5^2 \cdot 7$ | $3^3 \cdot 13$ | $2^5 \cdot 11$ | 5477747 | $2 \cdot 3 \cdot 59$ |
| 36 | $2^3 \cdot 3^2 \cdot 5$ | 19^2 | $2 \cdot 181$ | $3 \cdot 11^2$ | $2^2 \cdot 7 \cdot 13$ |
| 37 | $2 \cdot 5 \cdot 37$ | $7 \cdot 53$ | $2^2 \cdot 3 \cdot 31$ | 5717088 | $2 \cdot 11 \cdot 17$ |
| 38 | $2^2 \cdot 5 \cdot 19$ | $3 \cdot 127$ | $2 \cdot 191$ | 5831988 | $2^7 \cdot 3$ |
| 39 | $2 \cdot 3 \cdot 5 \cdot 13$ | $17 \cdot 23$ | $2^3 \cdot 7^2$ | $3 \cdot 131$ | $2 \cdot 197$ |
| 40 | $2^4 \cdot 5^2$ | 6031444 | $2 \cdot 3 \cdot 67$ | $13 \cdot 31$ | $2^2 \cdot 101$ |
| 41 | $2 \cdot 5 \cdot 41$ | $3 \cdot 137$ | $2^2 \cdot 103$ | $7 \cdot 59$ | $2 \cdot 3^2 \cdot 23$ |
| 42 | $2^2 \cdot 3 \cdot 5 \cdot 7$ | 6242821 | $2 \cdot 211$ | $3^2 \cdot 47$ | $2^3 \cdot 53$ |
| 43 | $2 \cdot 5 \cdot 43$ | 6344773 | $2^4 \cdot 3^3$ | 6364879 | $2 \cdot 7 \cdot 31$ |
| 44 | $2^3 \cdot 5 \cdot 11$ | $3^2 \cdot 7^2$ | $2 \cdot 13 \cdot 17$ | 6464037 | $2^2 \cdot 3 \cdot 37$ |
| 45 | $2 \cdot 3^2 \cdot 5^2$ | $11 \cdot 41$ | $2^2 \cdot 113$ | $3 \cdot 151$ | $2 \cdot 227$ |
| 46 | $2^2 \cdot 5 \cdot 23$ | 6637009 | $2 \cdot 3 \cdot 7 \cdot 11$ | 6655810 | $2^4 \cdot 29$ |
| 47 | $2 \cdot 5 \cdot 47$ | $3 \cdot 157$ | $2^3 \cdot 59$ | $11 \cdot 43$ | $2 \cdot 3 \cdot 79$ |
| 48 | $2^5 \cdot 3 \cdot 5$ | $13 \cdot 37$ | $2 \cdot 241$ | $3 \cdot 7 \cdot 23$ | $2^2 \cdot 11^2$ |
| 49 | $2 \cdot 5 \cdot 7^2$ | 6910815 | $2^2 \cdot 3 \cdot 41$ | $17 \cdot 29$ | $2 \cdot 13 \cdot 19$ |
| 50 | $2^2 \cdot 5^3$ | $3 \cdot 167$ | $2 \cdot 251$ | 7015680 | $2^3 \cdot 3^2 \cdot 7$ |

FACTORS AND PRIMES (Continued)

If n is not prime its prime factors are given.

| n | 5 | 6 | 7 | 8 | 9 |
|-----------|------------------------|--------------------------|----------------------|--------------------------|-----------------------|
| 0 | 6989700 | $2 \cdot 3$ | 8450980 | 2^3 | 3^2 |
| 1 | $3 \cdot 5$ | 2^4 | 2304489 | $2 \cdot 3^2$ | 2787536 |
| 2 | 5^2 | $2 \cdot 13$ | 3^3 | $2^2 \cdot 7$ | 4623980 |
| 3 | $5 \cdot 7$ | $2^2 \cdot 3^2$ | 5682017 | $2 \cdot 19$ | $3 \cdot 13$ |
| 4 | $3^2 \cdot 5$ | $2 \cdot 23$ | 6720979 | $2^4 \cdot 3$ | 7^2 |
| 5 | $5 \cdot 11$ | $2^3 \cdot 7$ | $3 \cdot 19$ | $2 \cdot 29$ | 7708520 |
| 6 | $5 \cdot 13$ | $2 \cdot 3 \cdot 11$ | 8260748 | $2^2 \cdot 17$ | $3 \cdot 23$ |
| 7 | $3 \cdot 5^2$ | $2^2 \cdot 19$ | $7 \cdot 11$ | $2 \cdot 3 \cdot 13$ | 8976271 |
| 8 | $5 \cdot 17$ | $2 \cdot 43$ | $3 \cdot 29$ | $2^3 \cdot 11$ | 9493900 |
| 9 | $5 \cdot 19$ | $2^5 \cdot 3$ | 9867717 | $2 \cdot 7^2$ | $3^2 \cdot 11$ |
| 10 | $3 \cdot 5 \cdot 7$ | $2 \cdot 53$ | 0293838 | $2^2 \cdot 3^3$ | 0374265 |
| 11 | $5 \cdot 23$ | $2^2 \cdot 29$ | $3^2 \cdot 13$ | $2 \cdot 59$ | $7 \cdot 17$ |
| 12 | 5^3 | $2 \cdot 3^2 \cdot 7$ | 1038037 | 2^7 | $3 \cdot 43$ |
| 13 | $3^3 \cdot 5$ | $2^3 \cdot 17$ | 1367206 | $2 \cdot 3 \cdot 23$ | 1430148 |
| 14 | $5 \cdot 29$ | $2 \cdot 73$ | $3 \cdot 7^2$ | $2^2 \cdot 37$ | 1731863 |
| 15 | $5 \cdot 31$ | $2^2 \cdot 3 \cdot 13$ | 1958997 | $2 \cdot 79$ | $3 \cdot 53$ |
| 16 | $3 \cdot 5 \cdot 11$ | $2 \cdot 83$ | 2227165 | $2^3 \cdot 3 \cdot 7$ | 13^2 |
| 17 | $5^2 \cdot 7$ | $2^4 \cdot 11$ | $3 \cdot 59$ | $2 \cdot 89$ | 2528530 |
| 18 | $5 \cdot 37$ | $2 \cdot 3 \cdot 31$ | $11 \cdot 17$ | $2^2 \cdot 47$ | $3^3 \cdot 7$ |
| 19 | $3 \cdot 5 \cdot 13$ | $2^2 \cdot 7^2$ | 2944662 | $2 \cdot 3^2 \cdot 11$ | 2988531 |
| 20 | $5 \cdot 41$ | $2 \cdot 103$ | $3^2 \cdot 23$ | $2^4 \cdot 13$ | $11 \cdot 19$ |
| 21 | $5 \cdot 43$ | $2^3 \cdot 3^3$ | $7 \cdot 31$ | $2 \cdot 109$ | $3 \cdot 73$ |
| 22 | $3^2 \cdot 5^2$ | $2 \cdot 113$ | 3560259 | $2^2 \cdot 3 \cdot 19$ | 3598355 |
| 23 | $5 \cdot 47$ | $2^2 \cdot 59$ | $3 \cdot 79$ | $2 \cdot 7 \cdot 17$ | 3783979 |
| 24 | $5 \cdot 7^2$ | $2 \cdot 3 \cdot 41$ | $13 \cdot 19$ | $2^3 \cdot 31$ | $3 \cdot 83$ |
| 25 | $3 \cdot 5 \cdot 17$ | 2^8 | 4099331 | $2 \cdot 3 \cdot 43$ | $7 \cdot 37$ |
| 26 | $5 \cdot 53$ | $2 \cdot 7 \cdot 19$ | $3 \cdot 89$ | $2^2 \cdot 67$ | 4297523 |
| 27 | $5^2 \cdot 11$ | $2^2 \cdot 3 \cdot 23$ | 4424798 | $2 \cdot 139$ | $3^2 \cdot 31$ |
| 28 | $3 \cdot 5 \cdot 19$ | $2 \cdot 11 \cdot 13$ | $7 \cdot 41$ | $2^3 \cdot 3^2$ | 17^2 |
| 29 | $5 \cdot 59$ | $2^3 \cdot 37$ | $3^3 \cdot 11$ | $2 \cdot 149$ | $13 \cdot 23$ |
| 30 | $5 \cdot 61$ | $2 \cdot 3^2 \cdot 17$ | 4871384 | $2^2 \cdot 7 \cdot 11$ | $3 \cdot 103$ |
| 31 | $3^2 \cdot 5 \cdot 7$ | $2^2 \cdot 79$ | 5010593 | $2 \cdot 3 \cdot 53$ | $11 \cdot 29$ |
| 32 | $5^2 \cdot 13$ | $2 \cdot 163$ | $3 \cdot 109$ | $2^3 \cdot 41$ | $7 \cdot 47$ |
| 33 | $5 \cdot 67$ | $2^4 \cdot 3 \cdot 7$ | 5276299 | $2 \cdot 13^2$ | $3 \cdot 113$ |
| 34 | $3 \cdot 5 \cdot 23$ | $2 \cdot 173$ | 5403295 | $2^2 \cdot 3 \cdot 29$ | 5428254 |
| 35 | $5 \cdot 71$ | $2^2 \cdot 89$ | $3 \cdot 7 \cdot 17$ | $2 \cdot 179$ | 5550944 |
| 36 | $5 \cdot 73$ | $2 \cdot 3 \cdot 61$ | 5646661 | $2^4 \cdot 23$ | $3^2 \cdot 41$ |
| 37 | $3 \cdot 5^3$ | $2^3 \cdot 47$ | $13 \cdot 29$ | $2 \cdot 3^2 \cdot 7$ | 5786392 |
| 38 | $5 \cdot 7 \cdot 11$ | $2 \cdot 193$ | $3^2 \cdot 43$ | $2^2 \cdot 97$ | 5899496 |
| 39 | $5 \cdot 79$ | $2^2 \cdot 3^2 \cdot 11$ | 5987905 | $2 \cdot 199$ | $3 \cdot 7 \cdot 19$ |
| 40 | $3^4 \cdot 5$ | $2 \cdot 7 \cdot 29$ | $11 \cdot 37$ | $2^3 \cdot 3 \cdot 17$ | 6117233 |
| 41 | $5 \cdot 83$ | $2^5 \cdot 13$ | $3 \cdot 139$ | $2 \cdot 11 \cdot 19$ | 6222140 |
| 42 | $5^2 \cdot 17$ | $2 \cdot 3 \cdot 71$ | $7 \cdot 61$ | $2^2 \cdot 107$ | $3 \cdot 11 \cdot 13$ |
| 43 | $3 \cdot 5 \cdot 29$ | $2^2 \cdot 109$ | $19 \cdot 23$ | $2 \cdot 3 \cdot 73$ | 6424645 |
| 44 | $5 \cdot 89$ | $2 \cdot 223$ | $3 \cdot 149$ | $2^6 \cdot 7$ | 6522463 |
| 45 | $5 \cdot 7 \cdot 13$ | $2^3 \cdot 3 \cdot 19$ | 6599162 | $2 \cdot 229$ | $3^3 \cdot 17$ |
| 46 | $3 \cdot 5 \cdot 31$ | $2 \cdot 233$ | 6693169 | $2^2 \cdot 3^2 \cdot 13$ | $7 \cdot 67$ |
| 47 | $5^2 \cdot 19$ | $2^2 \cdot 7 \cdot 17$ | $3^2 \cdot 53$ | $2 \cdot 239$ | 6803355 |
| 48 | $5 \cdot 97$ | $2 \cdot 3^5$ | 6875290 | $2^3 \cdot 61$ | $3 \cdot 163$ |
| 49 | $3^2 \cdot 5 \cdot 11$ | $2^4 \cdot 31$ | $7 \cdot 71$ | $2 \cdot 3 \cdot 83$ | 6981005 |
| 50 | $5 \cdot 101$ | $2 \cdot 11 \cdot 23$ | $3 \cdot 13^2$ | $2^2 \cdot 127$ | 7067178 |

FACTORS AND PRIMES (Continued)

| <i>n</i> | 0 | 1 | 2 | 3 | 4 |
|----------|--------------------------------|---------------------|--------------------------|------------------------|--------------------------------|
| 50 | $2^2 \cdot 5^3$ | 3 · 167 | 2 · 251 | 7015680 | $2^3 \cdot 3^2 \cdot 7$ |
| 51 | $2 \cdot 3 \cdot 5 \cdot 17$ | 7 · 73 | 2^9 | 3 ³ · 19 | 2 · 257 |
| 52 | $2^3 \cdot 5 \cdot 13$ | 7168377 | 2 · 3 ² · 29 | 7185017 | 2 ² · 131 |
| 53 | $2 \cdot 5 \cdot 53$ | 3 ² · 59 | $2^2 \cdot 7 \cdot 19$ | 13 · 41 | 2 · 3 · 89 |
| 54 | $2^2 \cdot 3^3 \cdot 5$ | 7331973 | 2 · 271 | 3 · 181 | $2^5 \cdot 17$ |
| 55 | $2 \cdot 5^2 \cdot 11$ | 19 · 29 | $2^3 \cdot 3 \cdot 23$ | 7 · 79 | 2 · 277 |
| 56 | $2^4 \cdot 5 \cdot 7$ | 3 · 11 · 17 | 2 · 281 | 7505084 | $2^2 \cdot 3 \cdot 47$ |
| 57 | $2 \cdot 3 \cdot 5 \cdot 19$ | 7566361 | $2^2 \cdot 11 \cdot 13$ | 3 · 191 | 2 · 7 · 41 |
| 58 | $2^2 \cdot 5 \cdot 29$ | 7 · 83 | 2 · 3 · 97 | 11 · 53 | 2 ³ · 73 |
| 59 | $2 \cdot 5 \cdot 59$ | 3 · 197 | $2^4 \cdot 37$ | 7730547 | $2 \cdot 3^3 \cdot 11$ |
| 60 | $2^3 \cdot 3 \cdot 5^2$ | 7788745 | 2 · 7 · 43 | 3 ² · 67 | 2 ² · 151 |
| 61 | $2 \cdot 5 \cdot 61$ | 13 · 47 | $2^2 \cdot 3^2 \cdot 17$ | 7874605 | 2 · 307 |
| 62 | $2^2 \cdot 5 \cdot 31$ | 3 ³ · 23 | 2 · 311 | 7 · 89 | $2^4 \cdot 3 \cdot 13$ |
| 63 | $2 \cdot 3^2 \cdot 5 \cdot 7$ | 8000294 | $2^3 \cdot 79$ | 3 · 211 | 2 · 317 |
| 64 | $2^7 \cdot 5$ | 8068580 | $2 \cdot 3 \cdot 107$ | 8082110 | $2^2 \cdot 7 \cdot 23$ |
| 65 | $2 \cdot 5^2 \cdot 13$ | 3 · 7 · 31 | $2^2 \cdot 163$ | 8149132 | 2 · 3 · 109 |
| 66 | $2^2 \cdot 3 \cdot 5 \cdot 11$ | 8202015 | 2 · 331 | 3 · 13 · 17 | 2 ³ · 83 |
| 67 | $2 \cdot 5 \cdot 67$ | 11 · 61 | $2^5 \cdot 3 \cdot 7$ | 8280151 | 2 · 337 |
| 68 | $2^3 \cdot 5 \cdot 17$ | 3 · 227 | $2 \cdot 11 \cdot 31$ | 8344207 | $2^2 \cdot 3^2 \cdot 19$ |
| 69 | $2 \cdot 3 \cdot 5 \cdot 23$ | 8394780 | $2^3 \cdot 173$ | $3^2 \cdot 7 \cdot 11$ | 2 · 347 |
| 70 | $2^2 \cdot 5^2 \cdot 7$ | 8457180 | $2 \cdot 3^3 \cdot 13$ | 19 · 37 | $2^6 \cdot 11$ |
| 71 | $2 \cdot 5 \cdot 71$ | 3 ² · 79 | $2^3 \cdot 89$ | 23 · 31 | $2 \cdot 3 \cdot 7 \cdot 17$ |
| 72 | $2^4 \cdot 3^2 \cdot 5$ | 7 · 103 | 2 · 19 ² | 3 · 241 | 2 ² · 181 |
| 73 | $2 \cdot 5 \cdot 73$ | 17 · 43 | $2^2 \cdot 3 \cdot 61$ | 8651040 | 2 · 367 |
| 74 | $2^2 \cdot 5 \cdot 37$ | 3 · 13 · 19 | $2 \cdot 7 \cdot 53$ | 8709888 | $2^3 \cdot 3 \cdot 31$ |
| 75 | $2 \cdot 3 \cdot 5^3$ | 8756399 | $2^4 \cdot 47$ | 3 · 251 | $2 \cdot 13 \cdot 29$ |
| 76 | $2^3 \cdot 5 \cdot 19$ | 8813847 | $2 \cdot 3 \cdot 127$ | 7 · 109 | 2 ² · 191 |
| 77 | $2 \cdot 5 \cdot 7 \cdot 11$ | 3 · 257 | $2^2 \cdot 193$ | 8881795 | $2 \cdot 3^2 \cdot 43$ |
| 78 | $2^2 \cdot 3 \cdot 5 \cdot 13$ | 11 · 71 | $2 \cdot 17 \cdot 23$ | 3 ³ · 29 | $2^4 \cdot 7^2$ |
| 79 | $2 \cdot 5 \cdot 79$ | 7 · 113 | $2^3 \cdot 3^2 \cdot 11$ | 13 · 61 | 2 · 397 |
| 80 | $2^5 \cdot 5^2$ | 3 ² · 89 | 2 · 401 | 11 · 73 | $2^2 \cdot 3 \cdot 67$ |
| 81 | $2 \cdot 3^4 \cdot 5$ | 9090209 | $2^2 \cdot 7 \cdot 29$ | 3 · 271 | $2 \cdot 11 \cdot 37$ |
| 82 | $2^2 \cdot 5 \cdot 41$ | 9143432 | $2 \cdot 3 \cdot 137$ | 9153998 | 2 ³ · 103 |
| 83 | $2 \cdot 5 \cdot 83$ | 3 · 277 | $2^6 \cdot 13$ | $7^2 \cdot 17$ | $2 \cdot 3 \cdot 139$ |
| 84 | $2^3 \cdot 3 \cdot 5 \cdot 7$ | 29^2 | $2 \cdot 421$ | 3 · 281 | $2^3 \cdot 211$ |
| 85 | $2 \cdot 5^2 \cdot 17$ | 23 · 37 | $2^2 \cdot 3 \cdot 71$ | 9309490 | $2 \cdot 7 \cdot 61$ |
| 86 | $2^2 \cdot 5 \cdot 43$ | 3 · 7 · 41 | 2 · 431 | 9360108 | $2^5 \cdot 3^3$ |
| 87 | $2 \cdot 3 \cdot 5 \cdot 29$ | 13 · 67 | $2^3 \cdot 109$ | 3 ² · 97 | $2 \cdot 19 \cdot 23$ |
| 88 | $2^4 \cdot 5 \cdot 11$ | 9449759 | $2 \cdot 3^2 \cdot 7^2$ | 9459607 | $2^3 \cdot 13 \cdot 17$ |
| 89 | $2 \cdot 5 \cdot 89$ | $3^4 \cdot 11$ | $2^2 \cdot 223$ | 19 · 47 | $2 \cdot 3 \cdot 149$ |
| 90 | $2^2 \cdot 3^2 \cdot 5^2$ | 17 · 53 | $2 \cdot 11 \cdot 41$ | $3 \cdot 7 \cdot 43$ | $2^3 \cdot 113$ |
| 91 | $2 \cdot 5 \cdot 7 \cdot 13$ | 9595184 | $2^4 \cdot 3 \cdot 19$ | 11 · 83 | 2 · 457 |
| 92 | $2^3 \cdot 5 \cdot 23$ | 3 · 307 | 2 · 461 | 13 · 71 | $2^2 \cdot 3 \cdot 7 \cdot 11$ |
| 93 | $2 \cdot 3 \cdot 5 \cdot 31$ | $7^2 \cdot 19$ | $2^2 \cdot 233$ | 3 · 311 | 2 · 467 |
| 94 | $2^2 \cdot 5 \cdot 47$ | 9735896 | $2 \cdot 3 \cdot 157$ | 23 · 41 | $2^4 \cdot 59$ |
| 95 | $2 \cdot 5^2 \cdot 19$ | 3 · 317 | $2^3 \cdot 7 \cdot 17$ | 9790929 | $2 \cdot 3^2 \cdot 53$ |
| 96 | $2^6 \cdot 3 \cdot 5$ | 31^2 | $2 \cdot 13 \cdot 37$ | 3 ² · 107 | 2 ² · 241 |
| 97 | $2 \cdot 5 \cdot 97$ | 9872192 | $2^2 \cdot 3^5$ | $7 \cdot 139$ | 2 · 487 |
| 98 | $2^2 \cdot 5 \cdot 7^2$ | $3^2 \cdot 109$ | 2 · 491 | 9925535 | $2^3 \cdot 3 \cdot 41$ |
| 99 | $2 \cdot 3^2 \cdot 5 \cdot 11$ | 9960737 | $2^5 \cdot 31$ | 3 · 331 | $2 \cdot 7 \cdot 71$ |
| 100 | $2^3 \cdot 5^3$ | 7 · 11 · 13 | $2 \cdot 3 \cdot 167$ | 17 · 59 | $2^2 \cdot 251$ |

FACTORS AND PRIMES (Continued)

| n | 5 | 6 | 7 | 8 | 9 |
|-----|---------------------------------|--------------------------------------|----------------------|--------------------------------------|-------------------------|
| 50 | 5 · 101 | 2 · 11 · 23 | 3 · 13 ² | 2 ² · 127 | 7067178 |
| 51 | 5 · 103 | 2 ² · 3 · 43 | 11 · 47 | 2 · 7 · 37 | 3 · 173 |
| 52 | 3 · 5 ² · 7 | 2 · 263 | 17 · 31 | 2 ⁴ · 3 · 11 | 23 ² |
| 53 | 5 · 107 | 2 ³ · 67 | 3 · 179 | 2 · 269 | 7 ² · 11 |
| 54 | 5 · 109 | 2 · 3 · 7 · 13 | 7379873 | 2 ² · 137 | 3 ² · 61 |
| 55 | 3 · 5 · 37 | 2 ² · 139 | 7458552 | 2 · 3 ² · 31 | 13 · 43 |
| 56 | 5 · 113 | 2 · 283 | 3 ⁴ · 7 | 2 ³ · 71 | 7551123 |
| 57 | 5 ² · 23 | 2 ⁶ · 3 ² | 7611758 | 2 · 17 ² | 3 · 193 |
| 58 | 3 ² · 5 · 13 | 2 · 293 | 7686381 | 2 ² · 3 · 7 ² | 19 · 31 |
| 59 | 5 · 7 · 17 | 2 ² · 149 | 3 · 199 | 2 · 13 · 23 | 7774268 |
| 60 | 5 · 11 ² | 2 · 3 · 101 | 7831887 | 2 ⁵ · 19 | 3 · 7 · 29 |
| 61 | 3 · 5 · 41 | 2 ³ · 7 · 11 | 7902852 | 2 · 3 · 103 | 7916906 |
| 62 | 5 ⁴ | 2 · 313 | 3 · 11 · 19 | 2 ² · 157 | 17 · 37 |
| 63 | 5 · 127 | 2 ² · 3 · 53 | 7 ² · 13 | 2 · 11 · 29 | 3 ² · 71 |
| 64 | 3 · 5 · 43 | 2 · 17 · 19 | 8109043 | 2 ³ · 3 ⁴ | 11 · 59 |
| 65 | 5 · 131 | 2 ⁴ · 41 | 3 ² · 73 | 2 · 7 · 47 | 8188854 |
| 66 | 5 · 7 · 19 | 2 · 3 ² · 37 | 23 · 29 | 2 ² · 167 | 3 · 223 |
| 67 | 3 ³ · 5 ² | 2 ² · 13 ² | 8305887 | 2 · 3 · 113 | 7 · 97 |
| 68 | 5 · 137 | 2 · 7 ³ | 3 · 229 | 2 ⁴ · 43 | 13 · 53 |
| 69 | 5 · 139 | 2 ² · 3 · 29 | 17 · 41 | 2 · 349 | 3 · 233 |
| 70 | 3 · 5 · 47 | 2 · 353 | 7 · 101 | 2 ² · 3 · 59 | 8506462 |
| 71 | 5 · 11 · 13 | 2 ² · 179 | 3 · 239 | 2 · 359 | 8567289 |
| 72 | 5 ² · 29 | 2 · 3 · 11 ² | 8615344 | 2 ³ · 7 · 13 | 3 ⁶ |
| 73 | 3 · 5 · 7 ² | 2 ⁵ · 23 | 11 · 67 | 2 · 3 ² · 41 | 8686444 |
| 74 | 5 · 149 | 2 · 373 | 3 ² · 83 | 2 ² · 11 · 17 | 7 · 107 |
| 75 | 5 · 151 | 2 ² · 3 ³ · 7 | 8790959 | 2 · 379 | 3 · 11 · 23 |
| 76 | 3 ² · 5 · 17 | 2 · 383 | 13 · 59 | 2 ⁸ · 3 | 8859263 |
| 77 | 5 ² · 31 | 2 ³ · 97 | 3 · 7 · 37 | 2 · 389 | 19 · 41 |
| 78 | 5 · 157 | 2 · 3 · 131 | 8959747 | 2 ² · 197 | 3 · 263 |
| 79 | 3 · 5 · 53 | 2 ² · 199 | 9014583 | 2 · 3 · 7 · 19 | 17 · 47 |
| 80 | 5 · 7 · 23 | 2 · 13 · 31 | 3 · 269 | 2 ³ · 101 | 9079485 |
| 81 | 5 · 163 | 2 ⁴ · 3 · 17 | 19 · 43 | 2 · 409 | 3 ² · 7 · 13 |
| 82 | 3 · 5 ² · 11 | 2 · 7 · 59 | 9175055 | 2 ² · 3 ² · 23 | 9185545 |
| 83 | 5 · 167 | 2 ² · 11 · 19 | 3 ³ · 31 | 2 · 419 | 9237620 |
| 84 | 5 · 13 ² | 2 · 3 ² · 47 | 7 · 11 ² | 2 ⁴ · 53 | 3 · 283 |
| 85 | 3 ² · 5 · 19 | 2 ³ · 107 | 9329808 | 2 · 3 · 11 · 13 | 9339932 |
| 86 | 5 · 173 | 2 · 433 | 3 · 17 ² | 2 ² · 7 · 31 | 11 · 79 |
| 87 | 5 ³ · 7 | 2 ² · 3 · 73 | 9429996 | 2 · 439 | 3 · 293 |
| 88 | 3 · 5 · 59 | 2 · 443 | 9479236 | 2 ³ · 3 · 37 | 7 · 127 |
| 89 | 5 · 179 | 2 ⁷ · 7 | 3 · 13 · 23 | 2 · 449 | 29 · 31 |
| 90 | 5 · 181 | 2 · 3 · 151 | 9576073 | 2 ² · 227 | 3 ² · 101 |
| 91 | 3 · 5 · 61 | 2 ² · 229 | 7 · 131 | 2 · 3 ³ · 17 | 9633155 |
| 92 | 5 ² · 37 | 2 · 463 | 3 ² · 103 | 2 ⁵ · 29 | 9680157 |
| 93 | 5 · 11 · 17 | 2 ³ · 3 ² · 13 | 9717396 | 2 · 7 · 67 | 3 · 313 |
| 94 | 3 ³ · 5 · 7 | 2 · 11 · 43 | 9763500 | 2 ² · 3 · 79 | 13 · 73 |
| 95 | 5 · 191 | 2 ² · 239 | 3 · 11 · 29 | 2 · 479 | 7 · 137 |
| 96 | 5 · 193 | 2 · 3 · 7 · 23 | 9854265 | 2 ³ · 11 ² | 3 · 17 · 19 |
| 97 | 3 · 5 ² · 13 | 2 ⁴ · 61 | 9898946 | 2 · 3 · 163 | 11 · 89 |
| 98 | 5 · 197 | 2 · 17 · 29 | 3 · 7 · 47 | 2 ² · 13 · 19 | 23 · 43 |
| 99 | 5 · 199 | 2 ² · 3 · 83 | 9986952 | 2 · 499 | 3 ³ · 37 |
| 100 | 3 · 5 · 67 | 2 · 503 | 19 · 53 | 2 ⁴ · 3 ² · 7 | 0038912 |

FACTORS AND PRIMES (Continued)

| n | 0 | 1 | 2 | 3 | 4 |
|------------|---------------------------------|------------------------|--------------------------------|-----------------------|-------------------------------|
| 100 | $2^3 \cdot 5^3$ | $7 \cdot 11 \cdot 13$ | $2 \cdot 3 \cdot 167$ | $17 \cdot 59$ | $2^2 \cdot 251$ |
| 101 | $2 \cdot 5 \cdot 101$ | $3 \cdot 337$ | $2^2 \cdot 11 \cdot 23$ | 0056094 | $2 \cdot 3 \cdot 13^2$ |
| 102 | $2^2 \cdot 3 \cdot 5 \cdot 17$ | 0090257 | $2 \cdot 7 \cdot 73$ | $3 \cdot 11 \cdot 31$ | 2^{10} |
| 103 | $2 \cdot 5 \cdot 103$ | 0132587 | $2^3 \cdot 3 \cdot 43$ | 0141003 | $2 \cdot 11 \cdot 47$ |
| 104 | $2^4 \cdot 5 \cdot 13$ | $3 \cdot 347$ | $2 \cdot 521$ | $7 \cdot 149$ | $2^2 \cdot 3^2 \cdot 29$ |
| 105 | $2 \cdot 3 \cdot 5^2 \cdot 7$ | 0216027 | $2^2 \cdot 263$ | $3^4 \cdot 13$ | $2 \cdot 17 \cdot 31$ |
| 106 | $2^2 \cdot 5 \cdot 53$ | 0257154 | $2 \cdot 3^2 \cdot 59$ | 0265333 | $2^3 \cdot 7 \cdot 19$ |
| 107 | $2 \cdot 5 \cdot 107$ | $3^2 \cdot 7 \cdot 17$ | $2^4 \cdot 67$ | $29 \cdot 37$ | $2 \cdot 3 \cdot 179$ |
| 108 | $2^3 \cdot 3^3 \cdot 5$ | $23 \cdot 47$ | $2 \cdot 541$ | $3 \cdot 19^2$ | $2^2 \cdot 271$ |
| 109 | $2 \cdot 5 \cdot 109$ | 0378248 | $2^2 \cdot 3 \cdot 7 \cdot 13$ | 0386202 | $2 \cdot 547$ |
| 110 | $2^2 \cdot 5^2 \cdot 11$ | $3 \cdot 367$ | $2 \cdot 19 \cdot 29$ | 0425755 | $2^4 \cdot 3 \cdot 23$ |
| 111 | $2 \cdot 3 \cdot 5 \cdot 37$ | $11 \cdot 101$ | $2^3 \cdot 139$ | $3 \cdot 7 \cdot 53$ | $2 \cdot 557$ |
| 112 | $2^5 \cdot 5 \cdot 7$ | $19 \cdot 59$ | $2 \cdot 3 \cdot 11 \cdot 17$ | 0503798 | $2^2 \cdot 281$ |
| 113 | $2 \cdot 5 \cdot 113$ | $3 \cdot 13 \cdot 29$ | $2^2 \cdot 283$ | $11 \cdot 103$ | $2 \cdot 3^4 \cdot 7$ |
| 114 | $2^2 \cdot 3 \cdot 5 \cdot 19$ | $7 \cdot 163$ | $2 \cdot 571$ | $3^2 \cdot 127$ | $2^3 \cdot 11 \cdot 13$ |
| 115 | $2 \cdot 5^2 \cdot 23$ | 0610753 | $2^7 \cdot 3^2$ | 0618293 | $2 \cdot 577$ |
| 116 | $2^3 \cdot 5 \cdot 29$ | $3^3 \cdot 43$ | $2 \cdot 7 \cdot 83$ | 0655797 | $2^2 \cdot 3 \cdot 97$ |
| 117 | $2 \cdot 3^2 \cdot 5 \cdot 13$ | 0685569 | $2^2 \cdot 293$ | $3 \cdot 17 \cdot 23$ | $2 \cdot 587$ |
| 118 | $2^2 \cdot 5 \cdot 59$ | 0722499 | $2 \cdot 3 \cdot 197$ | $7 \cdot 13^2$ | $2^5 \cdot 37$ |
| 119 | $2 \cdot 5 \cdot 7 \cdot 17$ | $3 \cdot 397$ | $2^3 \cdot 149$ | 0766404 | $2 \cdot 3 \cdot 199$ |
| 120 | $2^4 \cdot 3 \cdot 5^2$ | 0795430 | $2 \cdot 601$ | $3 \cdot 401$ | $2^2 \cdot 7 \cdot 43$ |
| 121 | $2 \cdot 5 \cdot 11^2$ | $7 \cdot 173$ | $2^2 \cdot 3 \cdot 101$ | 0838608 | $2 \cdot 607$ |
| 122 | $2^2 \cdot 5 \cdot 61$ | $3 \cdot 11 \cdot 37$ | $2 \cdot 13 \cdot 47$ | 0874265 | $2^3 \cdot 3^2 \cdot 17$ |
| 123 | $2 \cdot 3 \cdot 5 \cdot 41$ | 0902581 | $2^4 \cdot 7 \cdot 11$ | $3^2 \cdot 137$ | $2 \cdot 617$ |
| 124 | $2^3 \cdot 5 \cdot 31$ | $17 \cdot 73$ | $2 \cdot 3^3 \cdot 23$ | $11 \cdot 113$ | $2^2 \cdot 311$ |
| 125 | $2 \cdot 5^4$ | $3^2 \cdot 139$ | $2^2 \cdot 313$ | $7 \cdot 179$ | $2 \cdot 3 \cdot 11 \cdot 19$ |
| 126 | $2^2 \cdot 3^2 \cdot 5 \cdot 7$ | $13 \cdot 97$ | $2 \cdot 631$ | $3 \cdot 421$ | $2^4 \cdot 79$ |
| 127 | $2 \cdot 5 \cdot 127$ | $31 \cdot 41$ | $2^3 \cdot 3 \cdot 53$ | $19 \cdot 67$ | $2 \cdot 7^2 \cdot 13$ |
| 128 | $2^8 \cdot 5$ | $3 \cdot 7 \cdot 61$ | $2 \cdot 641$ | 1082267 | $2^2 \cdot 3 \cdot 107$ |
| 129 | $2 \cdot 3 \cdot 5 \cdot 43$ | 1109262 | $2^2 \cdot 17 \cdot 19$ | $3 \cdot 431$ | $2 \cdot 647$ |
| 130 | $2^2 \cdot 5^2 \cdot 13$ | 1142773 | $2 \cdot 3 \cdot 7 \cdot 31$ | 1149444 | $2^3 \cdot 163$ |
| 131 | $2 \cdot 5 \cdot 131$ | $3 \cdot 19 \cdot 23$ | $2^5 \cdot 41$ | $13 \cdot 101$ | $2 \cdot 3^2 \cdot 73$ |
| 132 | $2^3 \cdot 3 \cdot 5 \cdot 11$ | 1209028 | $2 \cdot 661$ | $3^3 \cdot 7^2$ | $2^2 \cdot 331$ |
| 133 | $2 \cdot 5 \cdot 7 \cdot 19$ | 11^3 | $2^2 \cdot 3^2 \cdot 37$ | $31 \cdot 43$ | $2 \cdot 23 \cdot 29$ |
| 134 | $2^2 \cdot 5 \cdot 67$ | $3^2 \cdot 149$ | $2 \cdot 11 \cdot 61$ | $17 \cdot 79$ | $2^6 \cdot 3 \cdot 7$ |
| 135 | $2 \cdot 3^3 \cdot 5^2$ | $7 \cdot 193$ | $2^3 \cdot 13^2$ | $3 \cdot 11 \cdot 41$ | $2 \cdot 677$ |
| 136 | $2^4 \cdot 5 \cdot 17$ | 1338581 | $2 \cdot 3 \cdot 227$ | $29 \cdot 47$ | $2^2 \cdot 11 \cdot 31$ |
| 137 | $2 \cdot 5 \cdot 137$ | $3 \cdot 457$ | $2^2 \cdot 7^3$ | 1376705 | $2 \cdot 3 \cdot 229$ |
| 138 | $2^3 \cdot 3 \cdot 5 \cdot 23$ | 1401937 | $2 \cdot 691$ | $3 \cdot 461$ | $2^3 \cdot 173$ |
| 139 | $2 \cdot 5 \cdot 139$ | $13 \cdot 107$ | $2^4 \cdot 3 \cdot 29$ | $7 \cdot 199$ | $2 \cdot 17 \cdot 41$ |
| 140 | $2^3 \cdot 5^2 \cdot 7$ | $3 \cdot 467$ | $2 \cdot 701$ | $23 \cdot 61$ | $2^2 \cdot 3^3 \cdot 13$ |
| 141 | $2 \cdot 3 \cdot 5 \cdot 47$ | $17 \cdot 83$ | $2^2 \cdot 353$ | $3^2 \cdot 157$ | $2 \cdot 7 \cdot 101$ |
| 142 | $2^2 \cdot 5 \cdot 71$ | $7^2 \cdot 29$ | $2 \cdot 3^2 \cdot 79$ | 1532049 | $2^4 \cdot 89$ |
| 143 | $2 \cdot 5 \cdot 11 \cdot 13$ | $3^3 \cdot 53$ | $2^3 \cdot 179$ | 1562462 | $2 \cdot 3 \cdot 239$ |
| 144 | $2^5 \cdot 3^2 \cdot 5$ | $11 \cdot 131$ | $2 \cdot 7 \cdot 103$ | $3 \cdot 13 \cdot 37$ | $2^2 \cdot 19^2$ |
| 145 | $2 \cdot 5^2 \cdot 29$ | 1616674 | $2^2 \cdot 3 \cdot 11^2$ | 1622656 | $2 \cdot 727$ |
| 146 | $2^2 \cdot 5 \cdot 73$ | $3 \cdot 487$ | $2 \cdot 17 \cdot 43$ | $7 \cdot 11 \cdot 19$ | $2^3 \cdot 3 \cdot 61$ |
| 147 | $2 \cdot 3 \cdot 5 \cdot 7^2$ | 1676127 | $2^5 \cdot 23$ | $3 \cdot 491$ | $2 \cdot 11 \cdot 67$ |
| 148 | $2^3 \cdot 5 \cdot 37$ | 1705551 | $2 \cdot 3 \cdot 13 \cdot 19$ | 1711412 | $2^2 \cdot 7 \cdot 53$ |
| 149 | $2 \cdot 5 \cdot 149$ | $3 \cdot 7 \cdot 71$ | $2^2 \cdot 373$ | 1740598 | $2 \cdot 3^2 \cdot 83$ |
| 150 | $2^2 \cdot 3 \cdot 5^3$ | $19 \cdot 79$ | $2 \cdot 751$ | $3^2 \cdot 167$ | $2^5 \cdot 47$ |

FACTORS AND PRIMES (Continued)

| n | 5 | 6 | 7 | 8 | 9 |
|------------|---------------------------------|--------------------------------------|--------------------------|--------------------------------------|----------------------------------|
| 100 | 3 · 5 · 67 | 2 · 503 | 19 · 53 | 2 ⁴ · 3 ² · 7 | 0038912 |
| 101 | 5 · 7 · 29 | 2 ³ · 127 | 3 ² · 113 | 2 · 509 | 0081742 |
| 102 | 5 ² · 41 | 2 · 3 ³ · 19 | 13 · 79 | 2 ² · 257 | 3 · 7 ³ |
| 103 | 3 ² · 5 · 23 | 2 ² · 7 · 37 | 17 · 61 | 2 · 3 · 173 | 0166155 |
| 104 | 3 · 11 · 19 | 2 · 523 | 3 · 349 | 2 ³ · 131 | 0207755 |
| 105 | 5 · 211 | 2 ⁵ · 3 · 11 | 7 · 151 | 2 · 23 ² | 3 · 353 |
| 106 | 3 · 5 · 71 | 2 · 13 · 41 | 11 · 97 | 2 ³ · 3 · 89 | 0289777 |
| 107 | 5 ² · 43 | 2 ² · 269 | 3 · 359 | 2 · 7 ² · 11 | 13 · 83 |
| 108 | 5 · 7 · 31 | 2 · 3 · 181 | 0362295 | 2 ⁶ · 17 | 3 ² · 11 ² |
| 109 | 3 · 5 · 73 | 2 ³ · 137 | 0402066 | 2 · 3 ² · 61 | 7 · 157 |
| 110 | 5 · 13 · 17 | 2 · 7 · 79 | 3 ³ · 41 | 2 ² · 277 | 0449315 |
| 111 | 5 · 223 | 2 ² · 3 ² · 31 | 0480532 | 2 · 13 · 43 | 3 · 373 |
| 112 | 3 ² · 5 ³ | 2 · 563 | 7 ² · 23 | 2 ³ · 3 · 47 | 0526939 |
| 113 | 5 · 227 | 2 ⁴ · 71 | 3 · 379 | 2 · 569 | 17 · 67 |
| 114 | 5 · 229 | 2 · 3 · 191 | 31 · 37 | 2 ² · 7 · 41 | 3 · 383 |
| 115 | 3 · 5 · 7 · 11 | 2 ³ · 17 ² | 13 · 89 | 2 · 3 · 193 | 19 · 61 |
| 116 | 5 · 233 | 2 · 11 · 53 | 3 · 389 | 2 ⁴ · 73 | 7 · 167 |
| 117 | 5 ² · 47 | 2 ³ · 3 · 7 ² | 11 · 107 | 2 · 19 · 31 | 3 ² · 131 |
| 118 | 3 · 5 · 79 | 2 · 593 | 0744507 | 2 ² · 3 ³ · 11 | 29 · 41 |
| 119 | 5 · 239 | 2 ² · 13 · 23 | 3 ² · 7 · 19 | 2 · 599 | 11 · 109 |
| 120 | 5 · 241 | 2 · 3 ² · 67 | 17 · 71 | 2 ³ · 151 | 3 · 13 · 31 |
| 121 | 3 ⁵ · 5 | 2 ⁶ · 19 | 0852906 | 2 · 3 · 7 · 29 | 23 · 53 |
| 122 | 5 ² · 7 ² | 2 · 613 | 3 · 409 | 2 ² · 307 | 0895519 |
| 123 | 5 · 13 · 19 | 2 ² · 3 · 103 | 0923697 | 2 · 619 | 3 · 7 · 59 |
| 124 | 3 · 5 · 83 | 2 · 7 · 89 | 29 · 43 | 2 ⁶ · 3 · 13 | 0965624 |
| 125 | 5 · 251 | 2 ³ · 157 | 3 · 419 | 2 · 17 · 37 | 1000257 |
| 126 | 5 · 11 · 23 | 2 · 3 · 211 | 7 · 181 | 2 ² · 317 | 3 ³ · 47 |
| 127 | 3 · 5 ³ · 17 | 2 ² · 11 · 29 | 1061909 | 2 · 3 ² · 71 | 1068705 |
| 128 | 5 · 257 | 2 · 643 | 3 ² · 11 · 13 | 2 ³ · 7 · 23 | 1102529 |
| 129 | 5 · 7 · 37 | 2 ⁴ · 3 ⁴ | 1129400 | 2 · 11 · 59 | 3 · 433 |
| 130 | 3 ² · 5 · 29 | 2 · 653 | 1162756 | 2 ² · 3 · 109 | 7 · 11 · 17 |
| 131 | 5 · 263 | 2 ² · 7 · 47 | 3 · 439 | 2 · 659 | 1202448 |
| 132 | 5 ² · 53 | 2 · 3 · 13 · 17 | 1228709 | 2 ⁴ · 83 | 3 · 443 |
| 133 | 3 · 5 · 89 | 2 ³ · 167 | 7 · 191 | 2 · 3 · 223 | 13 · 103 |
| 134 | 5 · 269 | 2 · 673 | 3 · 449 | 2 ² · 337 | 19 · 71 |
| 135 | 5 · 271 | 2 ² · 3 · 113 | 23 · 59 | 2 · 7 · 97 | 3 ² · 151 |
| 136 | 3 · 5 · 7 · 13 | 2 · 683 | 1357685 | 2 ³ · 3 ² · 19 | 37 ² |
| 137 | 5 ³ · 11 | 2 ⁵ · 43 | 3 ⁴ · 17 | 2 · 13 · 53 | 7 · 197 |
| 138 | 5 · 277 | 2 · 3 ² · 7 · 11 | 19 · 73 | 2 ² · 347 | 3 · 463 |
| 139 | 3 ² · 5 · 31 | 2 ² · 349 | 11 · 127 | 2 · 3 · 233 | 1458177 |
| 140 | 5 · 281 | 2 · 19 · 37 | 3 · 7 · 67 | 2 ⁷ · 11 | 1489110 |
| 141 | 5 · 283 | 2 ³ · 3 · 59 | 13 · 109 | 2 · 709 | 3 · 11 · 43 |
| 142 | 3 · 5 ² · 19 | 2 · 23 · 31 | 1544240 | 2 ² · 3 · 7 · 17 | 1550322 |
| 143 | 5 · 7 · 41 | 2 ² · 359 | 3 · 479 | 2 · 719 | 1580608 |
| 144 | 5 · 17 ² | 2 · 3 · 241 | 1604685 | 2 ³ · 181 | 3 ² · 7 · 23 |
| 145 | 3 · 5 · 97 | 2 ⁴ · 7 · 13 | 31 · 47 | 2 · 3 ⁶ | 1640553 |
| 146 | 5 · 293 | 2 · 733 | 3 ² · 163 | 2 ² · 367 | 13 · 113 |
| 147 | 5 ² · 59 | 2 ² · 3 ² · 41 | 7 · 211 | 2 · 739 | 3 · 17 · 29 |
| 148 | 3 ³ · 5 · 11 | 2 · 743 | 1723110 | 2 ⁴ · 3 · 31 | 1728947 |
| 149 | 5 · 13 · 23 | 2 ³ · 11 · 17 | 3 · 499 | 2 · 7 · 107 | 1758016 |
| 150 | 5 · 7 · 43 | 2 · 3 · 251 | 11 · 137 | 2 ² · 13 · 29 | 3 · 503 |

FACTORS AND PRIMES (Continued)

| <i>n</i> | 0 | 1 | 2 | 3 | 4 |
|------------|----------------------------------|-------------------------|--------------------------------|-------------------------|-------------------------------|
| 150 | $2^2 \cdot 3 \cdot 5^3$ | 19 · 79 | 2 · 751 | $3^2 \cdot 167$ | $2^5 \cdot 47$ |
| 151 | $2 \cdot 5 \cdot 151$ | 1792645 | $2^3 \cdot 3^3 \cdot 7$ | 17 · 89 | 2 · 757 |
| 152 | $2^4 \cdot 5 \cdot 19$ | $3^2 \cdot 13^2$ | 2 · 761 | 1826999 | $2^2 \cdot 3 \cdot 127$ |
| 153 | $2 \cdot 3^2 \cdot 5 \cdot 17$ | 1849752 | $2^2 \cdot 383$ | $3 \cdot 7 \cdot 73$ | $2 \cdot 13 \cdot 59$ |
| 154 | $2^2 \cdot 5 \cdot 7 \cdot 11$ | $2^3 \cdot 67$ | $2 \cdot 3 \cdot 257$ | 1883659 | $2^3 \cdot 193$ |
| 155 | $2 \cdot 5^2 \cdot 31$ | $3 \cdot 11 \cdot 47$ | $2^4 \cdot 97$ | 1911715 | $2 \cdot 3 \cdot 7 \cdot 37$ |
| 156 | $2^3 \cdot 3 \cdot 5 \cdot 13$ | 7 · 223 | $2 \cdot 11 \cdot 71$ | 3 · 521 | $2^2 \cdot 17 \cdot 23$ |
| 157 | $2 \cdot 5 \cdot 157$ | 1961762 | $2^2 \cdot 3 \cdot 131$ | $11^2 \cdot 13$ | 2 · 787 |
| 158 | $2^2 \cdot 5 \cdot 79$ | $3 \cdot 17 \cdot 31$ | $2 \cdot 7 \cdot 113$ | 1994809 | $2^4 \cdot 3^2 \cdot 11$ |
| 159 | $2 \cdot 3 \cdot 5 \cdot 53$ | $37 \cdot 43$ | $2^3 \cdot 199$ | $3^3 \cdot 59$ | 2 · 797 |
| 160 | $2^6 \cdot 5^2$ | 2043913 | $2 \cdot 3^2 \cdot 89$ | 7 · 229 | $2^2 \cdot 401$ |
| 161 | $2 \cdot 5 \cdot 7 \cdot 23$ | $3^2 \cdot 179$ | $2^2 \cdot 13 \cdot 31$ | 2076344 | $2 \cdot 3 \cdot 269$ |
| 162 | $2^2 \cdot 3^4 \cdot 5$ | 2097830 | 2 · 811 | 3 · 541 | $2^3 \cdot 7 \cdot 29$ |
| 163 | $2 \cdot 5 \cdot 163$ | 7 · 233 | $2^5 \cdot 3 \cdot 17$ | 23 · 71 | $2 \cdot 19 \cdot 43$ |
| 164 | $2^3 \cdot 5 \cdot 41$ | $3 \cdot 547$ | 2 · 821 | $31 \cdot 53$ | $2^2 \cdot 3 \cdot 137$ |
| 165 | $2 \cdot 3 \cdot 5^2 \cdot 11$ | $13 \cdot 127$ | $2^2 \cdot 7 \cdot 59$ | $3 \cdot 19 \cdot 29$ | 2 · 827 |
| 166 | $2^2 \cdot 5 \cdot 83$ | 11 · 151 | $2 \cdot 3 \cdot 277$ | 2208922 | $27 \cdot 13$ |
| 167 | $2 \cdot 5 \cdot 167$ | $3 \cdot 557$ | $2^3 \cdot 11 \cdot 19$ | 7 · 239 | $2 \cdot 3^3 \cdot 31$ |
| 168 | $2^4 \cdot 3 \cdot 5 \cdot 7$ | 41^2 | $2 \cdot 29^2$ | $3^2 \cdot 11 \cdot 17$ | $2^2 \cdot 421$ |
| 169 | $2 \cdot 5 \cdot 13^2$ | 19 · 89 | $2^2 \cdot 3^2 \cdot 47$ | 2286570 | $2 \cdot 7 \cdot 11^2$ |
| 170 | $2^2 \cdot 5^2 \cdot 17$ | $3^5 \cdot 7$ | $2 \cdot 23 \cdot 37$ | $13 \cdot 131$ | $2^3 \cdot 3 \cdot 71$ |
| 171 | $2 \cdot 3^2 \cdot 5 \cdot 19$ | 29 · 59 | $2^4 \cdot 107$ | 3 · 571 | 2 · 857 |
| 172 | $2^3 \cdot 5 \cdot 43$ | 2357809 | $2 \cdot 3 \cdot 7 \cdot 41$ | 2362853 | $2^2 \cdot 431$ |
| 173 | $2 \cdot 5 \cdot 173$ | 3 · 577 | $2^2 \cdot 433$ | 2387986 | $2 \cdot 3 \cdot 17^2$ |
| 174 | $2^2 \cdot 3 \cdot 5 \cdot 29$ | 2407988 | $2 \cdot 13 \cdot 67$ | $3 \cdot 7 \cdot 83$ | $2^4 \cdot 109$ |
| 175 | $2 \cdot 5^3 \cdot 7$ | 17 · 103 | $2^3 \cdot 3 \cdot 73$ | 2437819 | 2 · 877 |
| 176 | $2^5 \cdot 5 \cdot 11$ | $3 \cdot 587$ | 2 · 881 | 41 · 43 | $2^2 \cdot 3^2 \cdot 7^2$ |
| 177 | $2 \cdot 3 \cdot 5 \cdot 59$ | $7 \cdot 11 \cdot 23$ | $2^2 \cdot 443$ | $3^2 \cdot 197$ | 2 · 887 |
| 178 | $2^2 \cdot 5 \cdot 89$ | $13 \cdot 137$ | $2 \cdot 3^4 \cdot 11$ | 2511513 | $2^3 \cdot 223$ |
| 179 | $2 \cdot 5 \cdot 179$ | $3^2 \cdot 199$ | $2^3 \cdot 7$ | 11 · 163 | $2 \cdot 3 \cdot 13 \cdot 23$ |
| 180 | $2^3 \cdot 3^2 \cdot 5^2$ | 2555137 | $2 \cdot 17 \cdot 53$ | 3 · 601 | $2^2 \cdot 11 \cdot 41$ |
| 181 | $2 \cdot 5 \cdot 181$ | 2579185 | $2^2 \cdot 3 \cdot 151$ | $7^2 \cdot 37$ | 2 · 907 |
| 182 | $2^2 \cdot 5 \cdot 7 \cdot 13$ | 3 · 607 | 2 · 911 | 2607867 | $2^5 \cdot 3 \cdot 19$ |
| 183 | $2 \cdot 3 \cdot 5 \cdot 61$ | 2626883 | $2^3 \cdot 229$ | $3 \cdot 13 \cdot 47$ | $2 \cdot 7 \cdot 131$ |
| 184 | $2^4 \cdot 5 \cdot 23$ | 7 · 263 | $2 \cdot 3 \cdot 307$ | 19 · 97 | $2^2 \cdot 461$ |
| 185 | $2 \cdot 5^2 \cdot 37$ | 3 · 617 | $2^2 \cdot 463$ | 17 · 109 | $2 \cdot 3^2 \cdot 103$ |
| 186 | $2^2 \cdot 3 \cdot 5 \cdot 31$ | 2697464 | $2 \cdot 7^2 \cdot 19$ | $3^4 \cdot 23$ | $2^3 \cdot 233$ |
| 187 | $2 \cdot 5 \cdot 11 \cdot 17$ | 2720738 | $2^4 \cdot 3^2 \cdot 13$ | 2725378 | 2 · 937 |
| 188 | $2^3 \cdot 5 \cdot 47$ | $3^2 \cdot 11 \cdot 19$ | 2 · 941 | 7 · 269 | $2^2 \cdot 3 \cdot 157$ |
| 189 | $2 \cdot 3^3 \cdot 5 \cdot 7$ | $31 \cdot 61$ | $2^2 \cdot 11 \cdot 43$ | 3 · 631 | 2 · 947 |
| 190 | $2^2 \cdot 5^2 \cdot 19$ | 2789821 | $2 \cdot 3 \cdot 317$ | 11 · 173 | $2^4 \cdot 7 \cdot 17$ |
| 191 | $2 \cdot 5 \cdot 191$ | $3 \cdot 7^2 \cdot 13$ | $2^3 \cdot 239$ | 2817150 | $2 \cdot 3 \cdot 11 \cdot 29$ |
| 192 | $2^7 \cdot 3 \cdot 5$ | 17 · 113 | $2 \cdot 31^2$ | 3 · 641 | $2^2 \cdot 13 \cdot 37$ |
| 193 | $2 \cdot 5 \cdot 193$ | 2857823 | $2^2 \cdot 3 \cdot 7 \cdot 23$ | 2862319 | 2 · 967 |
| 194 | $2^2 \cdot 5 \cdot 97$ | 3 · 647 | 2 · 971 | 29 · 67 | $2^3 \cdot 3^5$ |
| 195 | $2 \cdot 3 \cdot 5^2 \cdot 13$ | 2902573 | $2^5 \cdot 61$ | $3^2 \cdot 7 \cdot 31$ | 2 · 977 |
| 196 | $2^3 \cdot 5 \cdot 7^2$ | 37 · 53 | $2 \cdot 3^2 \cdot 109$ | 13 · 151 | $2^2 \cdot 491$ |
| 197 | $2 \cdot 5 \cdot 197$ | $3^3 \cdot 73$ | $2^2 \cdot 17 \cdot 29$ | 2951271 | $2 \cdot 3 \cdot 7 \cdot 47$ |
| 198 | $2^2 \cdot 3^2 \cdot 5 \cdot 11$ | 7 · 283 | 2 · 991 | 3 · 661 | $2^6 \cdot 31$ |
| 199 | $2 \cdot 5 \cdot 199$ | 11 · 181 | $2^3 \cdot 3 \cdot 83$ | 2995073 | 2 · 997 |
| 200 | $2^4 \cdot 5^3$ | $3 \cdot 23 \cdot 29$ | $2 \cdot 7 \cdot 11 \cdot 13$ | 3016809 | $2^2 \cdot 3 \cdot 167$ |

FACTORS AND PRIMES (Continued)

| n | 5 | 6 | 7 | 8 | 9 |
|-----|-------------------------------------|--------------------------------------|-------------------------|--------------------------------------|--------------------------|
| 150 | 5 · 7 · 43 | 2 · 3 · 251 | 11 · 137 | 2 ³ · 13 · 29 | 3 · 503 |
| 151 | 3 · 5 · 101 | 2 ² · 379 | 37 · 41 | 2 · 3 · 11 · 23 | 7 ² · 31 |
| 152 | 5 ² · 61 | 2 · 7 · 109 | 3 · 509 | 2 ³ · 191 | 11 · 139 |
| 153 | 5 · 307 | 2 ⁹ · 3 | 29 · 53 | 2 · 769 | 3 ⁴ · 19 |
| 154 | 3 · 5 · 103 | 2 · 773 | 7 · 13 · 17 | 2 ² · 3 ² · 43 | 1900514 |
| 155 | 5 · 311 | 2 ² · 389 | 3 ² · 173 | 2 · 19 · 41 | 1928461 |
| 156 | 5 · 313 | 2 · 3 ³ · 29 | 1950690 | 2 ⁵ · 7 ² | 3 · 523 |
| 157 | 3 ² · 5 ² · 7 | 2 ³ · 197 | 19 · 83 | 2 · 3 · 263 | 1983821 |
| 158 | 5 · 317 | 2 · 13 · 61 | 3 · 23 ² | 2 ² · 397 | 7 · 227 |
| 159 | 5 · 11 · 29 | 2 ² · 3 · 7 · 19 | 2033049 | 2 · 17 · 47 | 3 · 13 · 41 |
| 160 | 3 · 5 · 107 | 2 · 11 · 73 | 2060159 | 2 ³ · 3 · 67 | 2065560 |
| 161 | 5 · 17 · 19 | 2 ⁴ · 101 | 3 · 7 ² · 11 | 2 · 809 | 2092468 |
| 162 | 5 ³ · 13 | 2 · 3 · 271 | 2113876 | 2 ² · 11 · 37 | 3 ² · 181 |
| 163 | 3 · 5 · 109 | 2 ² · 409 | 2140487 | 2 · 3 ² · 7 · 13 | 11 · 149 |
| 164 | 5 · 7 · 47 | 2 · 823 | 3 ³ · 61 | 2 ⁴ · 103 | 17 · 97 |
| 165 | 5 · 331 | 2 ³ · 3 ² · 23 | 2193225 | 2 · 829 | 3 · 7 · 79 |
| 166 | 3 ² · 5 · 37 | 2 · 7 ² · 17 | 2219356 | 2 ² · 3 · 139 | 2224563 |
| 167 | 5 ² · 67 | 2 ² · 419 | 3 · 13 · 43 | 2 · 839 | 23 · 73 |
| 168 | 5 · 337 | 2 · 3 · 281 | 7 · 241 | 2 ³ · 211 | 3 · 563 |
| 169 | 3 · 5 · 113 | 2 ⁵ · 53 | 2296818 | 2 · 3 · 283 | 2301934 |
| 170 | 5 · 11 · 31 | 2 · 853 | 3 · 569 | 2 ² · 7 · 61 | 2327421 |
| 171 | 5 · 7 ³ | 2 ² · 3 · 11 · 13 | 17 · 101 | 2 · 859 | 3 ² · 191 |
| 172 | 3 · 5 ² · 23 | 2 · 863 | 11 · 157 | 2 ⁶ · 3 ³ | 7 · 13 · 19 |
| 173 | 5 · 347 | 2 ³ · 7 · 31 | 3 ² · 193 | 2 · 11 · 79 | 37 · 47 |
| 174 | 5 · 349 | 2 · 3 ² · 97 | 2422929 | 2 ² · 19 · 23 | 3 · 11 · 53 |
| 175 | 3 ³ · 5 · 13 | 2 ² · 439 | 7 · 251 | 2 · 3 · 293 | 2452658 |
| 176 | 5 · 353 | 2 · 883 | 3 · 19 · 31 | 2 ³ · 13 · 17 | 29 · 61 |
| 177 | 5 ² · 71 | 2 ⁴ · 3 · 37 | 2496874 | 2 · 7 · 127 | 3 · 593 |
| 178 | 3 · 5 · 7 · 17 | 2 · 19 · 47 | 2521246 | 2 ² · 3 · 149 | 2526103 |
| 179 | 5 · 359 | 2 ² · 449 | 3 · 599 | 2 · 29 · 31 | 7 · 257 |
| 180 | 5 · 19 ² | 2 · 3 · 7 · 43 | 13 · 139 | 2 ⁴ · 113 | 3 ³ · 67 |
| 181 | 3 · 5 · 11 ² | 2 ³ · 227 | 23 · 79 | 2 · 3 ² · 101 | 17 · 107 |
| 182 | 5 ² · 73 | 2 · 11 · 83 | 3 ² · 7 · 29 | 2 ² · 457 | 31 · 59 |
| 183 | 5 · 367 | 2 ² · 3 ³ · 17 | 11 · 167 | 2 · 919 | 3 · 613 |
| 184 | 3 ² · 5 · 41 | 2 · 13 · 71 | 2664669 | 2 ³ · 3 · 7 · 11 | 43 ² |
| 185 | 5 · 7 · 53 | 2 ⁶ · 29 | 3 · 619 | 2 · 929 | 11 · 13 ² |
| 186 | 5 · 373 | 2 · 3 · 311 | 2711443 | 2 ² · 467 | 3 · 7 · 89 |
| 187 | 3 · 5 ⁴ | 2 ² · 7 · 67 | 2734643 | 2 · 939 | 2739268 |
| 188 | 5 · 13 · 29 | 2 · 23 · 41 | 3 · 17 · 37 | 2 ⁵ · 59 | 2762320 |
| 189 | 5 · 379 | 2 ³ · 3 · 79 | 7 · 271 | 2 · 13 · 73 | 3 ² · 211 |
| 190 | 3 · 5 · 127 | 2 · 953 | 2803507 | 2 ² · 3 ² · 53 | 23 · 83 |
| 191 | 5 · 383 | 2 ² · 479 | 3 ³ · 71 | 2 · 7 · 137 | 19 · 101 |
| 192 | 5 ² · 7 · 11 | 2 · 3 ² · 107 | 41 · 47 | 2 ³ · 241 | 3 · 643 |
| 193 | 3 ² · 5 · 43 | 2 ⁴ · 11 ² | 13 · 149 | 2 · 3 · 17 · 19 | 7 · 277 |
| 194 | 5 · 389 | 2 · 7 · 139 | 3 · 11 · 59 | 2 ² · 487 | 2896118 |
| 195 | 5 · 17 · 23 | 2 ² · 3 · 163 | 19 · 103 | 2 · 11 · 89 | 3 · 653 |
| 196 | 3 · 5 · 131 | 2 · 983 | 7 · 281 | 2 ⁴ · 3 · 41 | 11 · 179 |
| 197 | 5 ² · 79 | 2 ³ · 13 · 19 | 3 · 659 | 2 · 23 · 43 | 2964458 |
| 198 | 5 · 397 | 2 · 3 · 331 | 2981979 | 2 ² · 7 · 71 | 3 ² · 13 · 17 |
| 199 | 3 · 5 · 7 · 19 | 2 ² · 499 | 3003781 | 2 · 3 ³ · 37 | 3008128 |
| 200 | 5 · 401 | 2 · 17 · 59 | 3 ² · 223 | 2 ³ · 251 | 7 ² · 41 |

CALCULUS

DIFFERENTIALS

$$d ax = a dx$$

$$d e^x = e^x dx$$

$$d(u + v) = du + dv$$

$$d e^{ax} = a e^{ax} dx$$

$$d uv = u dv + v du$$

$$d a^x = a^x \log_e a dx$$

$$d \frac{u}{v} = \frac{v du - u dv}{v^2}$$

$$d \log_e x = x^{-1} dx$$

$$d x^n = n x^{n-1} dx$$

$$d \log_a x = x^{-1} \log_a e dx$$

$$d x^y = y x^{y-1} dx + x^y \log_e x dy$$

$$d x^x = x^x (1 + \log_e x) dx$$

$$d \sin x = \cos x dx$$

$$d \operatorname{vers}^{-1} x = (2x - x^2)^{-\frac{1}{2}} dx$$

$$d \cos x = -\sin x dx$$

$$d \sinh x = \cosh x dx$$

$$d \tan x = \sec^2 x dx$$

$$d \cosh x = \sinh x dx$$

$$d \cot x = -\operatorname{csc}^2 x dx$$

$$d \tanh x = \operatorname{sech}^2 x dx$$

$$d \sec x = \tan x \sec x dx$$

$$d \coth x = -\operatorname{csch}^2 x dx$$

$$d \csc x = -\cot x \cdot \csc x dx$$

$$d \operatorname{sech} x = -\operatorname{sech} x \tanh x dx$$

$$d \operatorname{vers} x = \sin x dx$$

$$d \operatorname{csch} x = -\operatorname{csch} x \coth x dx$$

$$d \sin^{-1} x = (1 - x^2)^{-\frac{1}{2}} dx$$

$$d \sinh^{-1} x = (x^2 + 1)^{-\frac{1}{2}} dx$$

$$d \cos^{-1} x = -(1 - x^2)^{-\frac{1}{2}} dx$$

$$d \cosh^{-1} x = (x^2 - 1)^{-\frac{1}{2}} dx$$

$$d \tan^{-1} x = (1 + x^2)^{-1} dx$$

$$d \tanh^{-1} x = (1 - x^2)^{-1} dx$$

$$d \cot^{-1} x = -(1 + x^2)^{-1} dx$$

$$d \coth^{-1} x = -(x^2 - 1)^{-1} dx$$

$$d \sec^{-1} x = x^{-1} (x^2 - 1)^{-\frac{1}{2}} dx$$

$$d \operatorname{sech}^{-1} x = -x^{-1} (1 - x^2)^{-\frac{1}{2}} dx$$

$$d \csc^{-1} x = -x^{-1} (x^2 - 1)^{-\frac{1}{2}} dx$$

$$d \operatorname{csch}^{-1} x = -x^{-1} (x^2 + 1)^{-\frac{1}{2}} dx$$

INTEGRALS

ELEMENTARY FORMS

1. $\int a \, dx = ax.$
2. $\int a \cdot f(x) \, dx = a \int f(x) \, dx.$
3. $\int \phi(y) \, dx = \int \frac{\phi(y)}{y'} \, dy,$ where $y' = dy/dx.$
4. $\int (u + v) \, dx = \int u \, dx + \int v \, dx,$ where u and v are any functions of $x.$
5. $\int u \, dv = uv - \int v \, du.$
6. $\int u \frac{dv}{dx} \, dx = uv - \int v \frac{du}{dx} \, dx.$
7. $\int x^n \, dx = \frac{x^{n+1}}{n+1},$ except $n = -1.$
8. $\int \frac{f'(x) \, dx}{f(x)} = \log f(x),$ $[d f(x) = f'(x) \, dx].$
9. $\int \frac{dx}{x} = \log x, \text{ or } \log (-x).$
10. $\int \frac{f'(x) \, dx}{2 \sqrt{f(x)}} = \sqrt{f(x)}.$ $[d f(x) = f'(x) \, dx].$
11. $\int e^x \, dx = e^x.$
12. $\int e^{ax} \, dx = e^{ax}/a.$
13. $\int b^{ax} \, dx = \frac{b^{ax}}{a \log b}.$
14. $\int \log x \, dx = x \log x - x.$
15. $\int a^x \log a \, dx = a^x.$
16. $\int \frac{dx}{a^2 + x^2} = \frac{1}{a} \tan^{-1} \left(\frac{x}{a} \right), \text{ or } -\frac{1}{a} \cot^{-1} \left(\frac{x}{a} \right).$
17. $\int \frac{dx}{a^2 - x^2} = \frac{1}{a} \tanh^{-1} \left(\frac{x}{a} \right), \text{ or } \frac{1}{2a} \log \frac{a+x}{a-x}.$
18. $\int \frac{dx}{x^2 - a^2} = -\frac{1}{a} \coth^{-1} \left(\frac{x}{a} \right), \text{ or } \frac{1}{2a} \log \frac{x-a}{x+a}.$
19. $\int \frac{dx}{\sqrt{a^2 - x^2}} = \sin^{-1} \left(\frac{x}{a} \right), \text{ or } -\cos^{-1} \left(\frac{x}{a} \right).$
20. $\int \frac{dx}{\sqrt{x^2 \pm a^2}} = \log (x + \sqrt{x^2 \pm a^2}).$
21. $\int \frac{dx}{x \sqrt{x^2 - a^2}} = \frac{1}{a} \cos^{-1} \left(\frac{a}{x} \right).$
22. $\int \frac{dx}{x \sqrt{a^2 \pm x^2}} = -\frac{1}{a} \log \left(\frac{a + \sqrt{a^2 \pm x^2}}{x} \right).$

INTEGRALS (Continued)

$$23. \int \frac{dx}{x \sqrt{a+bx}} = \frac{2}{\sqrt{-a}} \tan^{-1} \sqrt{\frac{a+bx}{-a}}, \text{ or } \frac{-2}{\sqrt{a}} \tanh^{-1} \sqrt{\frac{a+bx}{a}}.$$

FORMS CONTAINING $(a+bx)$

$$24. \int (a+bx)^n dx = \frac{(a+bx)^{n+1}}{(n+1)b}, \text{ except } n = -1.$$

$$25. \int x (a+bx)^n dx = \frac{1}{b^2(n+2)} (a+bx)^{n+2} - \frac{a}{b^2(n+1)} (a+bx)^{n+1}, \text{ except } n = -1 \text{ or } -2.$$

$$26. \int x^2 (a+bx)^n dx = \frac{1}{b^3} \left[\frac{(a+bx)^{n+3}}{n+3} - 2a \frac{(a+bx)^{n+2}}{n+2} + a^2 \frac{(a+bx)^{n+1}}{n+1} \right].$$

$$27. \int x^m (a+bx)^n dx = \frac{x^{m+1} (a+bx)^n}{m+n+1} + \frac{an}{m+n+1} \int x^m (a+bx)^{n-1} dx.$$

$$28. \int \frac{dx}{a+bx} = \frac{1}{b} \log (a+bx).$$

$$29. \int \frac{dx}{(a+bx)^2} = -\frac{1}{b(a+bx)}.$$

$$30. \int \frac{dx}{(a+bx)^3} = -\frac{1}{2b(a+bx)^2}.$$

$$31. \int \frac{xdx}{a+bx} = \frac{1}{b^2} [a+bx - a \log (a+bx)].$$

$$32. \int \frac{xdx}{(a+bx)^2} = \frac{1}{b^2} \left[\log (a+bx) + \frac{a}{a+bx} \right].$$

$$33. \int \frac{xdx}{(a+bx)^3} = \frac{1}{b^2} \left[-\frac{1}{a+bx} + \frac{a}{2(a+bx)^2} \right].$$

$$34. \int \frac{x^2 dx}{a+bx} = \frac{1}{b^3} \left[\frac{1}{2} (a+bx)^2 - 2a(a+bx) + a^2 \log (a+bx) \right]$$

$$35. \int \frac{x^2 dx}{(a+bx)^2} = \frac{1}{b^3} \left[a+bx - 2a \log (a+bx) - \frac{a^2}{a+bx} \right]$$

$$36. \int \frac{x^2 dx}{(a+bx)^3} = \frac{1}{b^3} \left[\log (a+bx) + \frac{2a}{a+bx} - \frac{a^2}{2(a+bx)^2} \right]$$

INTEGRALS (Continued)

$$37. \int \frac{dx}{x(a+bx)} = -\frac{1}{a} \log \frac{a+bx}{x}.$$

$$38. \int \frac{dx}{x(a+bx)^2} = \frac{1}{a(a+bx)} - \frac{1}{a^2} \log \frac{a+bx}{x}.$$

$$39. \int \frac{dx}{x^2(a+bx)} = -\frac{1}{ax} + \frac{b}{a^2} \log \frac{a+bx}{x}$$

$$40. \int \frac{dx}{x^2(a+bx)^2} = -\frac{a+2bx}{a^2x(a+bx)} + \frac{2b}{a^3} \log \frac{a+bx}{x}.$$

FORMS CONTAINING $c^2 \pm x^2$, $x^2 - c^2$

$$41. \int \frac{dx}{c^2 + x^2} = \frac{1}{c} \tan^{-1} \frac{x}{c}, \text{ or } \frac{1}{c} \sin^{-1} \frac{x}{\sqrt{c^2 + x^2}}.$$

$$42. \int \frac{dx}{c^2 - x^2} = \frac{1}{2c} \log \frac{c+x}{c-x}, \text{ or } \frac{1}{c} \tanh^{-1} \left(\frac{x}{c} \right).$$

$$43. \int \frac{dx}{x^2 - c^2} = \frac{1}{2c} \log \frac{x-c}{x+c}, \text{ or } -\frac{1}{c} \coth^{-1} \left(\frac{x}{c} \right).$$

FORMS CONTAINING $a+bx$ AND $a'+b'x$

$$44. \int \frac{dx}{(a+bx)(a'+b'x)} = \frac{1}{ab' - a'b} \cdot \log \left(\frac{a'+b'x}{a+bx} \right).$$

$$45. \int \frac{x dx}{(a+bx)(a'+b'x)} = \frac{1}{ab' - a'b} \left[\frac{a}{b} \log(a+bx) - \frac{a'}{b'} \log(a'+b'x) \right].$$

$$46. \int \frac{dx}{(a+bx)^2(a'+b'x)} = \frac{1}{ab' - a'b} \left(\frac{1}{a+bx} + \frac{b'}{ab' - a'b} \log \frac{a'+b'x}{a+bx} \right).$$

$$47. \int \frac{x dx}{(a+bx)^2(a'+b'x)} = \frac{-a}{b(ab' - a'b)(a+bx)} - \frac{a'}{(ab' - a'b)^2} \log \frac{a'+b'x}{a+bx}.$$

$$48. \int \frac{x^2 dx}{(a+bx)^2(a'+b'x)} = \frac{a^2}{b^2(ab' - a'b)(a+bx)} + \frac{1}{(ab' - a'b)^2} \left[\frac{a'^2}{b'} \log(a'+b'x) + \frac{a(ab' - 2a'b)}{b^2} \log(a+bx) \right].$$

$$49. \int \frac{dx}{(a+bx)^n(a'+b'x)^m} = \frac{1}{(m-1)(ab' - a'b)} \left(\frac{1}{(a+bx)^{n-1}(a'+b'x)^{m-1}} - (m+n-2)b \int \frac{dx}{(a+bx)^n(a'+b'x)^{m-1}} \right).$$

INTEGRALS (Continued)

FORMS CONTAINING $\sqrt{a+bx}$ AND $\sqrt{a'+b'x}$ $u = a+bx$
 $v = a'+b'x$ $k = ab' - a'b$

$$50. \int \sqrt{uv} \, dx = \frac{k+2bv}{4bb'} \sqrt{uv} - \frac{k^2}{8bb'} \int \frac{dx}{\sqrt{uv}}.$$

$$51. \int \frac{dx}{v\sqrt{u}} = \frac{1}{\sqrt{kb'}} \log \frac{b'\sqrt{u} - \sqrt{kb'}}{b'\sqrt{u} + \sqrt{kb'}} = \frac{2}{\sqrt{-kb'}} \tan^{-1} \frac{b'\sqrt{u}}{\sqrt{-kb'}}.$$

$$52. \int \frac{dx}{\sqrt{uv}} = \frac{2}{\sqrt{bb'}} \log (\sqrt{bb'u} + b\sqrt{v}) = \frac{2}{\sqrt{-bb'}} \tan^{-1} \sqrt{\frac{-b'u}{bv}},$$

$$\text{or } \frac{2}{\sqrt{bb'}} \tanh^{-1} \sqrt{\frac{b'u}{bv}} = \frac{1}{\sqrt{-bb'}} \sin^{-1} \frac{2bb'x + a'b + ab'}{k}.$$

$$53. \int \frac{xdx}{\sqrt{uv}} = \frac{\sqrt{uv}}{bb'} - \frac{ab' + a'b}{2bb'} \int \frac{dx}{\sqrt{uv}}.$$

$$54. \int \frac{dx}{v\sqrt{uv}} = -\frac{2\sqrt{u}}{k\sqrt{v}}.$$

$$55. \int \frac{\sqrt{v} \, dx}{\sqrt{u}} = \frac{1}{b} \sqrt{uv} - \frac{k}{2b} \int \frac{dx}{\sqrt{uv}}.$$

$$56. \int v^m \sqrt{u} \, dx = \frac{1}{(2m+3)b'} \left(2v^{m+1} \sqrt{u} + k \int \frac{v^m dx}{\sqrt{u}} \right).$$

$$57. \int \frac{dx}{v^m \sqrt{u}} = -\frac{1}{(m-1)k} \left(\frac{\sqrt{u}}{v^{m-1}} + \left(m - \frac{3}{2} \right) b \int \frac{dx}{v^{m-1} \sqrt{u}} \right).$$

FORMS CONTAINING $(a+bx^n)$

$$58. \int \frac{dx}{a+bx^2} = \frac{1}{\sqrt{ab}} \tan^{-1} \frac{x\sqrt{ab}}{a}.$$

$$59. \int \frac{dx}{a+bx^2} = \frac{1}{2\sqrt{-ab}} \log \frac{a+x\sqrt{-ab}}{a-x\sqrt{-ab}}, \text{ or } \frac{1}{\sqrt{-ab}} \tanh^{-1} \frac{x\sqrt{-ab}}{a}.$$

$$60. \int \frac{xdx}{a+bx^2} = \frac{1}{2b} \log \left(x^2 + \frac{a}{b} \right).$$

$$61. \int \frac{x^2 dx}{a+bx^2} = \frac{x}{b} - \frac{a}{b} \int \frac{dx}{a+bx^2}.$$

INTEGRALS (Continued)

$$62. \int \frac{dx}{(a + bx^2)^2} = \frac{x}{2a(a + bx^2)} + \frac{1}{2a} \int \frac{dx}{a + bx^2}.$$

$$63. \int \frac{dx}{(a + bx^2)^{m+1}} = \frac{1}{2ma} \frac{x}{(a + bx^2)^m} + \frac{2m-1}{2ma} \int \frac{dx}{(a + bx^2)^m}.$$

$$64. \int \frac{xdx}{(a + bx^2)^{m+1}} = \frac{1}{2} \int \frac{dz}{(a + bz)^{m+1}}, \quad [z = x^2].$$

$$65. \int \frac{x^2 dx}{(a + bx^2)^{m+1}} = \frac{-x}{2mb(a + bx^2)^m} + \frac{1}{2mb} \int \frac{dx}{(a + bx^2)^m}.$$

$$66. \int \frac{dx}{x^2(a + bx^2)^{m+1}} = \frac{1}{a} \int \frac{dx}{x^2(a + bx^2)^m} - \frac{b}{a} \int \frac{dx}{(a + bx^2)^{m+1}}.$$

$$67. \int \frac{dx}{x(a + bx^2)} = \frac{1}{2a} \log \frac{x^2}{a + bx^2}.$$

$$68. \int \frac{dx}{x^2(a + bx^2)} = -\frac{1}{ax} - \frac{b}{a} \int \frac{dx}{a + bx^2}.$$

$$69. \int \frac{dx}{a + bx^3} = \frac{k}{3a} \left[\frac{1}{2} \log \frac{(k+x)^2}{k^2 - kx + x^2} + \sqrt{3} \tan^{-1} \frac{2x - k}{k\sqrt{3}} \right], [bk^3 = a].$$

$$70. \int \frac{xdx}{a + bx^3} = \frac{1}{3bk} \left[\frac{1}{2} \log \frac{k^2 - kx + x^2}{(k+x)^2} + \sqrt{3} \tan^{-1} \frac{2x - k}{k\sqrt{3}} \right], [bk^3 = a].$$

$$71. \int \frac{dx}{x(a + bx^n)} = \frac{1}{an} \log \frac{x^n}{a + bx^n}.$$

$$72. \int \frac{dx}{(a + bx^n)^{m+1}} = \frac{1}{a} \int \frac{dx}{(a + bx^n)^m} - \frac{b}{a} \int \frac{x^n dx}{(a + bx^n)^{m+1}}.$$

$$73. \int \frac{x^m dx}{(a + bx^n)^{p+1}} = \frac{1}{b} \int \frac{x^{m-n} dx}{(a + bx^n)^p} - \frac{a}{b} \int \frac{x^{m-n} dx}{(a + bx^n)^{p+1}}.$$

$$74. \int \frac{dx}{x^m(a + bx^n)^{p+1}} = \frac{1}{a} \int \frac{dx}{x^m(a + bx^n)^p} - \frac{b}{a} \int \frac{dx}{x^{m-n}(a + bx^n)^{p+1}}.$$

$$75. \int x^m(a + bx^n)^p dx = \frac{x^{m-n+1}(a + bx^n)^{p+1}}{b(np + m + 1)} - \frac{a(m - n + 1)}{b(np + m + 1)} \int x^{m-n}(a + bx^n)^p dx.$$

INTEGRALS (Continued)

$$76. \int x^m(a + bx^n)^p dx = \frac{x^{m+1}(a + bx^n)^p}{np + m + 1} + \frac{anp}{np + m + 1} \int x^m(a + bx^n)^{p-1} dx.$$

$$77. \int x^{m-1}(a + bx^n)^p dx = \frac{1}{b(m + np)} [x^{m-n}(a + bx^n)^{p+1} - (m - n)a \int x^{m-n-1}(a + bx^n)^p dx].$$

$$78. \int x^{m-1}(a + bx^n)^p dx = \frac{1}{m + np} [x^m(a + bx^n)^p + npa \int x^{m-1}(a + bx^n)^{p-1} dx].$$

$$79. \int x^{m-1}(a + bx^n)^p dx = \frac{1}{ma} [x^m(a + bx^n)^{p+1} - (m + np + n)b \int x^{m+n-1}(a + bx^n)^p dx].$$

$$80. \int x^{m-1}(a + bx^n)^p dx = \frac{1}{an(p + 1)} [-x^m(a + bx^n)^{p+1} + (m + np + n) \int x^{m-1}(a + bx^n)^{p+1} dx].$$

FORMS CONTAINING $(a + bx + cx^2)$

$X = a + bx + cx^2$ and $q = 4ac - b^2$

$$81. \int \frac{dx}{X} = \frac{2}{\sqrt{q}} \tan^{-1} \frac{2cx + b}{\sqrt{q}}.$$

$$82. \int \frac{dx}{X} = \frac{-2}{\sqrt{-q}} \tanh^{-1} \frac{2cx + b}{\sqrt{-q}}.$$

$$83. \int \frac{dx}{X} = \frac{1}{\sqrt{-q}} \log \frac{2cx + b - \sqrt{-q}}{2cx + b + \sqrt{-q}}.$$

$$84. \int \frac{dx}{X^2} = \frac{2cx + b}{qX} + \frac{2c}{q} \int \frac{dx}{X}.$$

$$85. \int \frac{dx}{X^3} = \frac{2cx + b}{q} \left(\frac{1}{2X^2} + \frac{3c}{qX} \right) + \frac{6c^2}{q^2} \int \frac{dx}{X}.$$

$$86. \int \frac{dx}{X^{n+1}} = \frac{2cx + b}{nqX^n} + \frac{2(2n - 1)c}{qn} \int \frac{dx}{X^n}.$$

$$87. \int \frac{xdx}{X} = \frac{1}{2c} \log X - \frac{b}{2c} \int \frac{dx}{X}.$$

$$88. \int \frac{xdx}{X^2} = -\frac{bx + 2a}{qX} - \frac{b}{q} \int \frac{dx}{X}.$$

$$89. \int \frac{xdx}{X^{n+1}} = -\frac{2a + bx}{nqX^n} - \frac{b(2n - 1)}{nq} \int \frac{dx}{X^n}.$$

$$90. \int \frac{x^2}{X} dx = \frac{x}{c} - \frac{b}{2c^2} \log X + \frac{b^2 - 2ac}{2c^2} \int \frac{dx}{X}.$$

$$91. \int \frac{x^2}{X^2} dx = \frac{(b^2 - 2ac)x + ab}{cqX} + \frac{2a}{q} \int \frac{dx}{X}.$$

INTEGRALS (Continued)

$$92. \int \frac{x^m dx}{X^{n+1}} = -\frac{x^{m-1}}{(2n-m+1)cX^n} - \frac{n-m+1}{2n-m+1} \cdot \frac{b}{c} \int \frac{x^{m-1} dx}{X^{n+1}} + \frac{m-1}{2n-m+1} \cdot \frac{a}{c} \int \frac{x^{m-2} dx}{X^{n+1}}.$$

$$93. \int \frac{dx}{xX} = \frac{1}{2a} \log \frac{x^2}{X} - \frac{b}{2a} \int \frac{dx}{X}.$$

$$94. \int \frac{dx}{x^2 X} = \frac{b}{2a^2} \log \frac{X}{x^2} - \frac{1}{ax} + \left(\frac{b^2}{2a^2} - \frac{c}{a} \right) \int \frac{dx}{X}.$$

$$95. \int \frac{dx}{xX^n} = \frac{1}{2a(n-1)X^{n-1}} - \frac{b}{2a} \int \frac{dx}{X^n} + \frac{1}{a} \int \frac{dx}{xX^{n-1}}.$$

$$96. \int \frac{dx}{x^m X^{n+1}} = -\frac{1}{(m-1)ax^{m-1}X^n} - \frac{n+m-1}{m-1} \cdot \frac{b}{a} \int \frac{dx}{x^{m-1}X^{n+1}} - \frac{2n+m-1}{m-1} \cdot \frac{c}{a} \int \frac{dx}{x^{m-2}X^{n+1}}.$$

FORMS CONTAINING $\sqrt{a+bx}$

$$97. \int \sqrt{a+bx} dx = \frac{2}{3b} \sqrt{(a+bx)^3}.$$

$$98. \int x\sqrt{a+bx} dx = -\frac{2(2a-3bx)\sqrt{(a+bx)^3}}{15b^2}.$$

$$99. \int x^2\sqrt{a+bx} dx = \frac{2(8a^2-12abx+15b^2x^2)\sqrt{(a+bx)^3}}{105b^3}.$$

$$100. \int \frac{\sqrt{a+bx}}{x} dx = 2\sqrt{a+bx} + a \int \frac{dx}{x\sqrt{a+bx}}.$$

$$101. \int \frac{dx}{\sqrt{a+bx}} = \frac{2\sqrt{a+bx}}{b}.$$

$$102. \int \frac{xdx}{\sqrt{a+bx}} = -\frac{2(2a-bx)}{3b^2} \sqrt{a+bx}.$$

$$103. \int \frac{x^2 dx}{\sqrt{a+bx}} = \frac{2(8a^2-4abx+3b^2x^2)}{15b^3} \sqrt{a+bx}.$$

$$104. \int \frac{x^m dx}{\sqrt{a+bx}} = \frac{2x^m \sqrt{a+bx}}{(2m+1)b} - \frac{2ma}{(2m+1)b} \int \frac{x^{m-1} dx}{\sqrt{a+bx}}.$$

$$105. \int \frac{dx}{x\sqrt{a+bx}} = \frac{1}{\sqrt{a}} \log \left(\frac{\sqrt{a+bx} - \sqrt{a}}{\sqrt{a+bx} + \sqrt{a}} \right).$$

$$106. \int \frac{dx}{x\sqrt{a+bx}} = \frac{-2}{\sqrt{a}} \tanh^{-1} \sqrt{\frac{a+bx}{a}}.$$

INTEGRALS (Continued)

$$107. \int \frac{dx}{x^2 \sqrt{a+bx}} = -\frac{\sqrt{a+bx}}{ax} - \frac{b}{2a} \int \frac{dx}{x\sqrt{a+bx}}.$$

$$108. \int \frac{dx}{x^n \sqrt{a+bx}} = -\frac{\sqrt{a+bx}}{(n-1)ax^{n-1}} - \frac{(2n-3)b}{(2n-2)a} \int \frac{dx}{x^{n-1} \sqrt{a+bx}}.$$

$$109. \int (a+bx)^{\pm n/2} dx = \frac{2(a+bx)^{\frac{2 \pm n}{2}}}{b(2 \pm n)}.$$

$$110. \int x(a+bx)^{\pm n/2} dx = \frac{2}{b^2} \left[\frac{(a+bx)^{\frac{4 \pm n}{2}}}{4 \pm n} - \frac{a(a+bx)^{\frac{2 \pm n}{2}}}{2 \pm n} \right].$$

$$111. \int \frac{dx}{x(a+bx)^{m/2}} = \frac{1}{a} \int \frac{dx}{x(a+bx)^{\frac{m-2}{2}}} - \frac{b}{a} \int \frac{dx}{(a+bx)^{m/2}}.$$

$$112. \int \frac{(a+bx)^{n/2} dx}{x} = b \int (a+bx)^{\frac{n-2}{2}} dx + a \int \frac{(a+bx)^{\frac{n-2}{2}}}{x} dx.$$

FORMS CONTAINING $\sqrt{x^2 \pm a^2}$

$$113. \int \sqrt{x^2 \pm a^2} dx = \frac{1}{2} [x\sqrt{x^2 \pm a^2} \pm a^2 \log (x + \sqrt{x^2 \pm a^2})].$$

$$114. \int \frac{dx}{\sqrt{x^2 \pm a^2}} = \log (x + \sqrt{x^2 \pm a^2}).$$

$$115. \int \frac{dx}{x\sqrt{x^2 - a^2}} = \frac{1}{a} \cos^{-1} \left(\frac{a}{x} \right), \text{ or } \frac{1}{a} \sec^{-1} \left(\frac{x}{a} \right).$$

$$116. \int \frac{dx}{x\sqrt{x^2 + a^2}} = -\frac{1}{a} \log \left(\frac{a + \sqrt{x^2 + a^2}}{x} \right).$$

$$117. \int \frac{\sqrt{x^2 + a^2}}{x} dx = \sqrt{x^2 + a^2} - a \log \left(\frac{a + \sqrt{x^2 + a^2}}{x} \right).$$

$$118. \int \frac{\sqrt{x^2 - a^2}}{x} dx = \sqrt{x^2 - a^2} - a \cos^{-1} \frac{a}{x}.$$

$$119. \int \frac{x dx}{\sqrt{x^2 \pm a^2}} = \sqrt{x^2 \pm a^2}.$$

$$120. \int x \sqrt{x^2 \pm a^2} dx = \frac{1}{3} \sqrt{(x^2 \pm a^2)^3}.$$

INTEGRALS (Continued)

$$121. \int \sqrt{(x^2 \pm a^2)^3} dx = \frac{1}{4} \left[x \sqrt{(x^2 \pm a^2)^3} \pm \frac{3a^2x}{2} \sqrt{x^2 \pm a^2} + \frac{3a^4}{2} \log (x + \sqrt{x^2 \pm a^2}) \right].$$

$$122. \int \frac{dx}{\sqrt{(x^2 \pm a^2)^3}} = \frac{\pm x}{a^2 \sqrt{x^2 \pm a^2}}.$$

$$123. \int \frac{x dx}{\sqrt{(x^2 \pm a^2)^3}} = \frac{-1}{\sqrt{x^2 \pm a^2}}.$$

$$124. \int x \sqrt{(x^2 \pm a^2)^3} dx = \frac{1}{5} \sqrt{(x^2 \pm a^2)^5}.$$

$$125. \int x^2 \sqrt{x^2 \pm a^2} dx = \frac{x}{4} \sqrt{(x^2 \pm a^2)^3} \mp \frac{a^2}{8} x \sqrt{x^2 \pm a^2} - \frac{a^4}{8} \log (x + \sqrt{x^2 \pm a^2}).$$

$$126. \int \frac{x^2 dx}{\sqrt{x^2 \pm a^2}} = \frac{x}{2} \sqrt{x^2 \pm a^2} \mp \frac{a^2}{2} \log (x + \sqrt{x^2 \pm a^2}).$$

$$127. \int \frac{dx}{x^2 \sqrt{x^2 \pm a^2}} = \mp \frac{\sqrt{x^2 \pm a^2}}{a^2 x}.$$

$$128. \int \frac{\sqrt{x^2 \pm a^2} dx}{x^2} = -\frac{\sqrt{x^2 \pm a^2}}{x} + \log (x + \sqrt{x^2 \pm a^2}).$$

$$129. \int \frac{x^2 dx}{\sqrt{(x^2 \pm a^2)^3}} = \frac{-x}{\sqrt{x^2 \pm a^2}} + \log (x + \sqrt{x^2 \pm a^2}).$$

FORMS CONTAINING $\sqrt{a^2 - x^2}$

$$130. \int \sqrt{a^2 - x^2} dx = \frac{1}{2} \left[x \sqrt{a^2 - x^2} + a^2 \sin^{-1} \left(\frac{x}{a} \right) \right].$$

$$131. \int \frac{dx}{\sqrt{a^2 - x^2}} = \sin^{-1} \left(\frac{x}{a} \right), \text{ or } -\cos^{-1} \left(\frac{x}{a} \right).$$

$$132. \int \frac{dx}{x \sqrt{a^2 - x^2}} = -\frac{1}{a} \log \left(\frac{a + \sqrt{a^2 - x^2}}{x} \right).$$

$$133. \int \frac{\sqrt{a^2 - x^2}}{x} dx = \sqrt{a^2 - x^2} - a \log \left(\frac{a + \sqrt{a^2 - x^2}}{x} \right).$$

$$134. \int \frac{x dx}{\sqrt{a^2 - x^2}} = -\sqrt{a^2 - x^2}.$$

$$135. \int x \sqrt{a^2 - x^2} dx = -\frac{1}{3} \sqrt{(a^2 - x^2)^3}.$$

$$136. \int \sqrt{(a^2 - x^2)^3} dx = \frac{1}{4} \left[x \sqrt{(a^2 - x^2)^3} + \frac{3a^2x}{2} \sqrt{a^2 - x^2} + \frac{3a^4}{2} \sin^{-1} \frac{x}{a} \right].$$

INTEGRALS (Continued)

$$137. \int \frac{dx}{\sqrt{(a^2 - x^2)^3}} = \frac{x}{a^2 \sqrt{a^2 - x^2}}.$$

$$138. \int \frac{x dx}{\sqrt{(a^2 - x^2)^3}} = \frac{1}{\sqrt{a^2 - x^2}}.$$

$$139. \int x \sqrt{(a^2 - x^2)^3} dx = -\frac{1}{5} \sqrt{(a^2 - x^2)^5}.$$

$$140. \int x^2 \sqrt{a^2 - x^2} dx = -\frac{x}{4} \sqrt{(a^2 - x^2)^3} + \frac{a^2}{8} \left(x \sqrt{a^2 - x^2} + a^2 \sin^{-1} \frac{x}{a} \right).$$

$$141. \int \frac{x^2 dx}{\sqrt{a^2 - x^2}} = -\frac{x}{2} \sqrt{a^2 - x^2} + \frac{a^2}{2} \sin^{-1} \frac{x}{a}.$$

$$142. \int \frac{dx}{x^2 \sqrt{a^2 - x^2}} = -\frac{\sqrt{a^2 - x^2}}{a^2 x}.$$

$$143. \int \frac{\sqrt{a^2 - x^2}}{x^2} dx = -\frac{\sqrt{a^2 - x^2}}{x} - \sin^{-1} \frac{x}{a}.$$

$$144. \int \frac{x^2 dx}{\sqrt{(a^2 - x^2)^3}} = \frac{x}{\sqrt{a^2 - x^2}} - \sin^{-1} \frac{x}{a}.$$

FORMS CONTAINING $\sqrt{a + bx + cx^2}$

$$X = a + bx + cx^2, q = 4ac - b^2, \text{ and } k = \frac{4c}{q}.$$

$$145. \int \frac{dx}{\sqrt{X}} = \frac{1}{\sqrt{c}} \log \left(\sqrt{X} + x \sqrt{c} + \frac{b}{2\sqrt{c}} \right).$$

$$146. \int \frac{dx}{\sqrt{X}} = \frac{1}{\sqrt{c}} \sinh^{-1} \left(\frac{2cx + b}{\sqrt{4ac - b^2}} \right), \quad \text{if } c > 0.$$

$$147. \int \frac{dx}{\sqrt{X}} = \frac{1}{\sqrt{-c}} \sin^{-1} \left(\frac{-2cx - b}{\sqrt{b^2 - 4ac}} \right), \quad \text{if } c < 0.$$

$$148. \int \frac{dx}{X \sqrt{X}} = \frac{2(2cx + b)}{q \sqrt{X}}.$$

$$149. \int \frac{dx}{X^2 \sqrt{X}} = \frac{2(2cx + b)}{3q \sqrt{X}} \left(\frac{1}{X} + 2k \right).$$

$$150. \int \frac{dx}{X^n \sqrt{X}} = \frac{2(2cx + b)\sqrt{X}}{(2n - 1)qX^n} + \frac{2k(n - 1)}{2n - 1}$$

$$\int \frac{dx}{X^{n-1} \sqrt{X}}.$$

$$151. \int \sqrt{X} dx = \frac{(2cx + b)\sqrt{X}}{4c} + \frac{1}{2k} \int \frac{dx}{\sqrt{X}}.$$

INTEGRALS (Continued)

$$152. \int X \sqrt{X} dx = \frac{(2cx + b) \sqrt{X}}{8c} \left(X + \frac{3}{2k} \right) + \frac{3}{8k^2} \int \frac{dx}{\sqrt{X}}.$$

$$153. \int X^2 \sqrt{X} dx = \frac{(2cx + b) \sqrt{X}}{12c} \left(X^2 + \frac{5X}{4k} + \frac{15}{8k^2} \right) + \frac{5}{16k^3} \int \frac{dx}{\sqrt{X}}.$$

$$154. \int X^n \sqrt{X} dx = \frac{(2cx + b) X^n \sqrt{X}}{4(n+1)c} + \frac{2n+1}{2(n+1)k} \int \frac{X^n dx}{\sqrt{X}}.$$

$$155. \int \frac{x dx}{\sqrt{X}} = \frac{\sqrt{X}}{c} - \frac{b}{2c} \int \frac{dx}{\sqrt{X}}.$$

$$156. \int \frac{x dx}{X \sqrt{X}} = -\frac{2(bx + 2a)}{q \sqrt{X}}.$$

$$157. \int \frac{x dx}{X^n \sqrt{X}} = -\frac{\sqrt{X}}{(2n-1)cX^n} - \frac{b}{2c} \int \frac{dx}{X^n \sqrt{X}}.$$

$$158. \int \frac{x^2 dx}{\sqrt{X}} = \left(\frac{x}{2c} - \frac{3b}{4c^2} \right) \sqrt{X} + \frac{3b^2 - 4ac}{8c^2} \int \frac{dx}{\sqrt{X}}.$$

$$159. \int \frac{x^2 dx}{X \sqrt{X}} = \frac{(2b^2 - 4ac)x + 2ab}{cq \sqrt{X}} + \frac{1}{c} \int \frac{dx}{\sqrt{X}}.$$

$$160. \int \frac{x^2 dx}{X^n \sqrt{X}} = \frac{(2b^2 - 4ac)x + 2ab}{(2n-1)cq X^{n-1} \sqrt{X}} + \frac{4ac + (2n-3)b^2}{(2n-1)cq} \int \frac{dx}{X^{n-1} \sqrt{X}}.$$

$$161. \int \frac{x^3 dx}{\sqrt{X}} = \left(\frac{x^2}{3c} - \frac{5bx}{12c^2} + \frac{5b^2}{8c^3} - \frac{2a}{3c^2} \right) \sqrt{X} + \left(\frac{3ab}{4c^2} - \frac{5b^3}{16c^3} \right) \int \frac{dx}{\sqrt{X}}.$$

$$162. \int x \sqrt{X} dx = \frac{X \sqrt{X}}{3c} - \frac{b}{2c} \int \sqrt{X} dx.$$

$$163. \int x X \sqrt{X} dx = \frac{X^2 \sqrt{X}}{5c} - \frac{b}{2c} \int X \sqrt{X} dx.$$

$$164. \int \frac{x X^n dx}{\sqrt{X}} = \frac{X^n \sqrt{X}}{(2n+1)c} - \frac{b}{2c} \int \frac{X^n dx}{\sqrt{X}}.$$

INTEGRALS (Continued)

$$165. \int x^2 \sqrt{X} dx = \left(x - \frac{5b}{6c}\right) \frac{X \sqrt{X}}{4c} + \frac{5b^2 - 4ac}{16c^2} \int \sqrt{X} dx.$$

$$166. \int \frac{dx}{x \sqrt{X}} = -\frac{1}{\sqrt{a}} \log \left(\frac{\sqrt{X} + \sqrt{a}}{x} + \frac{b}{2\sqrt{a}} \right), \quad \text{if } a > 0.$$

$$167. \int \frac{dx}{x \sqrt{X}} = -\frac{1}{\sqrt{-a}} \sin^{-1} \left(\frac{bx + 2a}{x \sqrt{b^2 - 4ac}} \right), \quad \text{if } a < 0.$$

$$168. \int \frac{dx}{x \sqrt{X}} = -\frac{2\sqrt{X}}{bx}, \quad \text{if } a = 0.$$

$$169. \int \frac{dx}{x^2 \sqrt{X}} = -\frac{\sqrt{X}}{ax} - \frac{b}{2a} \int \frac{dx}{x \sqrt{X}}.$$

$$170. \int \frac{\sqrt{X} dx}{x} = \sqrt{X} + \frac{b}{2} \int \frac{dx}{\sqrt{X}} + a \int \frac{dx}{x \sqrt{X}}.$$

$$171. \int \frac{\sqrt{X} dx}{x^2} = -\frac{\sqrt{X}}{x} + \frac{b}{2} \int \frac{dx}{x \sqrt{X}} + c \int \frac{dx}{\sqrt{X}}.$$

MISCELLANEOUS ALGEBRAIC FORMS

$$172. \int \sqrt{2ax - x^2} dx = \frac{1}{2} [(x - a) \sqrt{2ax - x^2} + a^2 \sin^{-1} (x - a)/a].$$

$$173. \int \sqrt{ax^2 + c} dx = \frac{x}{2} \sqrt{ax^2 + c} + \frac{c}{2\sqrt{a}} \log (x\sqrt{a} + \sqrt{ax^2 + c}), \quad [a > 0].$$

$$= \frac{x}{2} \sqrt{ax^2 + c} + \frac{c}{2\sqrt{-a}} \sin^{-1} \left(x \sqrt{\frac{-a}{c}} \right), \quad [a < 0].$$

$$174. \int \frac{dx}{\sqrt{2ax - x^2}} = \cos^{-1} \left(\frac{a - x}{a} \right).$$

$$175. \int \frac{dx}{\sqrt{a + bx} \cdot \sqrt{a' + b'x}} = \frac{2}{\sqrt{-bb'}} \tan^{-1}$$

$$\sqrt{\frac{-b'(a + bx)}{b(a' + b'x)}}.$$

$$176. \int \sqrt{\frac{1+x}{1-x}} dx = \sin^{-1} x - \sqrt{1-x^2}.$$

$$177. \int \frac{dx}{\sqrt{a \pm 2bx + cx^2}} = \frac{1}{\sqrt{c}} \log (\pm b + cx + \sqrt{c} \sqrt{a \pm 2bx + cx^2}).$$

INTEGRALS (Continued)

$$178. \int \frac{dx}{\sqrt{a \pm 2bx - cx^2}} = \frac{1}{\sqrt{c}} \sin^{-1} \frac{cx \mp b}{\sqrt{b^2 + ac}}.$$

$$179. \int \frac{xdx}{\sqrt{a \pm 2bx + cx^2}} = \frac{1}{c} \sqrt{a \pm 2bx + cx^2} - \frac{b}{\sqrt{c^3}} \log (\pm b + cx + \sqrt{c} \sqrt{a \pm 2bx + cx^2}).$$

$$180. \int \frac{xdx}{\sqrt{a \pm 2bx - cx^2}} = -\frac{1}{c} \sqrt{a \pm 2bx - cx^2} \pm \frac{b}{\sqrt{c^3}} \sin^{-1} \frac{cx \mp b}{\sqrt{b^2 + ac}}.$$

TRIGONOMETRIC FORMS

$$- 181. \int \sin x \, dx = -\cos x, \text{ or versin } x.$$

$$- 182. \int \cos x \, dx = \sin x, \text{ or } -\text{coversin } x.$$

$$- 183. \int \tan x \, dx = -\log \cos x, \text{ or } \log \sec x.$$

$$- 184. \int \cot x \, dx = \log \sin x.$$

$$185. \int \sec x \, dx = \log \tan \left(\frac{\pi}{4} + \frac{x}{2} \right).$$

$$- 186. \int \csc x \, dx = \log \tan \frac{1}{2} x.$$

$$187. \int \sin^2 x \, dx = -\frac{1}{2} \cos x \sin x + \frac{1}{2} x = \frac{1}{2} x - \frac{1}{4} \sin 2x.$$

$$188. \int \sin^3 x \, dx = -\frac{1}{3} \cos x (\sin^2 x + 2).$$

$$189. \int \sin^n x \, dx = -\frac{\sin^{n-1} x \cos x}{n} + \frac{n-1}{n} \int \sin^{n-2} x \, dx.$$

$$190. \int \cos^2 x \, dx = \frac{1}{2} \sin x \cos x + \frac{1}{2} x = \frac{1}{2} x + \frac{1}{4} \sin 2x.$$

$$191. \int \cos^3 x \, dx = \frac{1}{3} \sin x (\cos^2 x + 2).$$

$$192. \int \cos^n x \, dx = \frac{1}{n} \cos^{n-1} x \sin x + \frac{n-1}{n} \int \cos^{n-2} x \, dx.$$

$$193. \int \sin \frac{x}{a} \, dx = -a \cos \frac{x}{a}.$$

$$194. \int \cos \frac{x}{a} \, dx = a \sin \frac{x}{a}.$$

$$195. \int \sin (a + bx) \, dx = -\frac{1}{b} \cos (a + bx).$$

$$196. \int \cos (a + bx) \, dx = \frac{1}{b} \sin (a + bx).$$

$$197. \int \frac{dx}{\sin x} = -\frac{1}{2} \log \frac{1 + \cos x}{1 - \cos x} = \log \tan \frac{x}{2}.$$

$$198. \int \frac{dx}{\cos x} = \log \tan \left(\frac{\pi}{4} + \frac{x}{2} \right) = \frac{1}{2} \log \left(\frac{1 + \sin x}{1 - \sin x} \right).$$

$$- 199. \int \frac{dx}{\cos^2 x} = \tan x.$$

INTEGRALS (Continued)

$$200. \int \frac{dx}{\cos^n x} = \frac{1}{n-1} \cdot \frac{\sin x}{\cos^{n-1} x} + \frac{n-2}{n-1} \int \frac{dx}{\cos^{n-2} x}.$$

$$201. \int \frac{dx}{1 \pm \sin x} = \mp \tan \left(\frac{\pi}{4} \mp \frac{x}{2} \right).$$

$$202. \int \frac{dx}{1 + \cos x} = \tan \frac{x}{2}.$$

$$203. \int \frac{dx}{1 - \cos x} = -\cot \frac{x}{2}.$$

$$204. \int \frac{dx}{a + b \sin x} = \frac{2}{\sqrt{a^2 - b^2}} \tan^{-1} \frac{a \tan \frac{1}{2} x + b}{\sqrt{a^2 - b^2}},$$

$$= \frac{1}{\sqrt{b^2 - a^2}} \log \frac{a \tan \frac{1}{2} x + b - \sqrt{b^2 - a^2}}{a \tan \frac{1}{2} x + b + \sqrt{b^2 - a^2}}.$$

$$205. \int \frac{dx}{a + b \cos x} = \frac{2}{\sqrt{a^2 - b^2}} \tan^{-1} \frac{\sqrt{a^2 - b^2} \tan \frac{1}{2} x}{a + b},$$

$$= \frac{1}{\sqrt{b^2 - a^2}} \log \left(\frac{\sqrt{b^2 - a^2} \tan \frac{1}{2} x + a + b}{\sqrt{b^2 - a^2} \tan \frac{1}{2} x - a - b} \right).$$

$$206. \int \sin mx \sin nx \, dx = \frac{\sin (m-n)x}{2(m-n)} - \frac{\sin (m+n)x}{2(m+n)},$$

[$m^2 \neq n^2$].

$$207. \int x \sin^2 x \, dx = \frac{x^2}{4} - \frac{x \sin 2x}{4} - \frac{\cos 2x}{8}.$$

$$208. \int x^2 \sin^2 x \, dx = \frac{x^3}{6} - \left(\frac{x^2}{4} - \frac{1}{8} \right) \sin 2x - \frac{x \cos 2x}{4}.$$

$$209. \int x \sin^3 x \, dx = \frac{x \cos 3x}{12} - \frac{\sin 3x}{36} - \frac{3}{4} x \cos x + \frac{3}{4} \sin x.$$

$$210. \int \sin^4 x \, dx = \frac{3x}{8} - \frac{\sin 2x}{4} + \frac{\sin 4x}{32}.$$

$$211. \int \cos mx \cos nx \, dx = \frac{\sin (m-n)x}{2(m-n)} + \frac{\sin (m+n)x}{2(m+n)},$$

[$m^2 \neq n^2$].

$$212. \int x \cos^2 x \, dx = \frac{x^2}{4} + \frac{x \sin 2x}{4} + \frac{\cos 2x}{8}.$$

$$213. \int x^2 \cos^2 x \, dx = \frac{x^3}{6} + \left(\frac{x^2}{4} - \frac{1}{8} \right) \sin 2x + \frac{x \cos 2x}{4}.$$

$$214. \int x \cos^3 x \, dx = \frac{x \sin 3x}{12} + \frac{\cos 3x}{36} + \frac{3}{4} x \sin x + \frac{3}{4} \cos x.$$

$$215. \int \cos^4 x \, dx = \frac{3x}{8} + \frac{\sin 2x}{4} + \frac{\sin 4x}{32}.$$

INTEGRALS (Continued)

$$216. \int \frac{\sin x \, dx}{x^m} = -\frac{\sin x}{(m-1)x^{m-1}} + \frac{1}{m-1} \int \frac{\cos x \, dx}{x^{m-1}}.$$

$$217. \int \frac{\cos x \, dx}{x^m} = -\frac{\cos x}{(m-1)x^{m-1}} - \frac{1}{m-1} \int \frac{\sin x \, dx}{x^{m-1}}.$$

$$218. \int \tan^3 x \, dx = \frac{1}{2} \tan^2 x + \log \cos x.$$

$$219. \int \tan^4 x \, dx = \frac{1}{3} \tan^3 x - \tan x + x.$$

$$220. \int \cot^3 x \, dx = -\frac{1}{2} \cot^2 x - \log \sin x.$$

$$221. \int \cot^4 x \, dx = -\frac{1}{3} \cot^3 x + \cot x + x.$$

$$222. \int \cot^n x \, dx = -\frac{\cot^{n-1} x}{n-1} - \int \cot^{n-2} x \, dx, [n \neq 1].$$

$$223. \int \sin x \cos x \, dx = \frac{1}{2} \sin^2 x$$

$$224. \int \sin mx \cos nx \, dx = -\frac{\cos(m-n)x}{2(m-n)} - \frac{\cos(m+n)x}{2(m+n)}.$$

$$225. \int \sin^2 x \cos^2 x \, dx = -\frac{1}{8} \left(\frac{1}{4} \sin 4x - x \right).$$

$$226. \int \sin x \cos^m x \, dx = -\frac{\cos^{m+1} x}{m+1}.$$

$$227. \int \sin^m x \cos x \, dx = \frac{\sin^{m+1} x}{m+1}.$$

$$228. \int \cos^m x \sin^n x \, dx = \frac{\cos^{m-1} x \sin^{n+1} x}{m+n} + \frac{m-1}{m+n} \int \cos^{m-2} x \sin^n x \, dx.$$

$$229. \int \cos^m x \sin^n x \, dx = -\frac{\sin^{n-1} x \cos^{m+1} x}{m+n} + \frac{n-1}{m+n} \int \cos^m x \sin^{n-2} x \, dx.$$

$$230. \int \frac{\cos^m x \, dx}{\sin^n x} = -\frac{\cos^{m+1} x}{(n-1) \sin^{n-1} x} - \frac{m-n+2}{n-1} \int \frac{\cos^m x \, dx}{\sin^{n-2} x}.$$

$$231. \int \frac{\cos^m x \, dx}{\sin^n x} = \frac{\cos^{m-1} x}{(m-n) \sin^{n-1} x} + \frac{m-1}{m-n} \int \frac{\cos^{m-2} x \, dx}{\sin^n x}.$$

$$232. \int \frac{\sin^m x \, dx}{\cos^n x} = -\int \frac{\cos^m \left(\frac{\pi}{2} - x \right) d \left(\frac{\pi}{2} - x \right)}{\sin^n \left(\frac{\pi}{2} - x \right)}.$$

$$233. \int \frac{\sin x \, dx}{\cos^2 x} = \frac{1}{\cos x} = \sec x.$$

INTEGRALS (Continued)

$$234. \int \frac{\sin^2 x \, dx}{\cos x} = -\sin x + \log \tan \left(\frac{\pi}{4} + \frac{x}{2} \right).$$

$$235. \int \frac{\cos x \, dx}{\sin^2 x} = \frac{-1}{\sin x} = -\operatorname{cosec} x.$$

$$236. \int \frac{dx}{\sin x \cos x} = \log \tan x.$$

$$237. \int \frac{dx}{\sin x \cos^2 x} = \frac{1}{\cos x} + \log \tan \frac{x}{2}.$$

$$238. \int \frac{dx}{\sin x \cos^n x} = \frac{1}{(n-1) \cos^{n-1} x} + \int \frac{dx}{\sin x \cos^{n-2} x},$$

$[n \neq 1].$

$$239. \int \frac{dx}{\sin^2 x \cos x} = -\frac{1}{\sin x} + \log \tan \left(\frac{\pi}{4} + \frac{x}{2} \right).$$

$$240. \int \frac{dx}{\sin^2 x \cos^2 x} = -2 \cot 2x.$$

$$241. \int \frac{dx}{\sin^m x \cos^n x} = -\frac{1}{m-1} \cdot \frac{1}{\sin^{m-1} x \cdot \cos^{n-1} x} +$$

$$\frac{m+n-2}{m-1} \int \frac{dx}{\sin^{m-2} x \cdot \cos^n x}.$$

$$242. \int \frac{dx}{\sin^m x} = -\frac{1}{m-1} \cdot \frac{\cos x}{\sin^{m-1} x} + \frac{m-2}{m-1} \int \frac{dx}{\sin^{m-2} x}.$$

$$243. \int \frac{dx}{\sin^2 x} = -\cot x.$$

$$244. \int \tan^2 x \, dx = \tan x - x.$$

$$245. \int \tan^n x \, dx = \frac{\tan^{n-1} x}{n-1} - \int \tan^{n-2} x \, dx.$$

$$246. \int \cot^2 x \, dx = -\cot x - x.$$

$$247. \int \cot^n x \, dx = -\frac{\cot^{n-1} x}{n-1} - \int \cot^{n-2} x \, dx.$$

$$248. \int \sec^2 x \, dx = \tan x.$$

$$249. \int \sec^n x \, dx = \int \frac{dx}{\cos^n x}.$$

$$250. \int \csc^2 x \, dx = -\cot x.$$

$$251. \int \csc^n x \, dx = \int \frac{dx}{\sin^n x}.$$

$$252. \int x \sin x \, dx = \sin x - x \cos x.$$

$$253. \int x^2 \sin x \, dx = 2x \sin x - (x^2 - 2) \cos x.$$

$$254. \int x^3 \sin x \, dx = (3x^2 - 6) \sin x - (x^3 - 6x) \cos x.$$

$$255. \int x^m \sin x \, dx = -x^m \cos x + m \int x^{m-1} \cos x \, dx.$$

INTEGRALS (Continued)

$$256. \int x \cos x \, dx = \cos x + x \sin x.$$

$$257. \int x^2 \cos x \, dx = 2x \cos x + (x^2 - 2) \sin x.$$

$$258. \int x^3 \cos x \, dx = (3x^2 - 6) \cos x + (x^3 - 6x) \sin x.$$

$$259. \int x^m \cos x \, dx = x^m \sin x - m \int x^{m-1} \sin x \, dx.$$

$$260. \int \frac{\sin x}{x} \, dx = x - \frac{x^3}{3 \cdot 3!} + \frac{x^5}{5 \cdot 5!} - \frac{x^7}{7 \cdot 7!} + \frac{x^9}{9 \cdot 9!} \cdots$$

$$261. \int \frac{\cos x}{x} \, dx = \log x - \frac{x^2}{2 \cdot 2!} + \frac{x^4}{4 \cdot 4!} - \frac{x^6}{6 \cdot 6!} + \frac{x^8}{8 \cdot 8!} \cdots$$

$$262. \int \sin^{-1} x \, dx = x \sin^{-1} x + \sqrt{1 - x^2}.$$

$$263. \int \cos^{-1} x \, dx = x \cos^{-1} x - \sqrt{1 - x^2}.$$

$$264. \int \tan^{-1} x \, dx = x \tan^{-1} x - \frac{1}{2} \log(1 + x^2).$$

$$265. \int \cot^{-1} x \, dx = x \cot^{-1} x + \frac{1}{2} \log(1 + x^2).$$

$$266. \int \sec^{-1} x \, dx = x \sec^{-1} x - \log(x + \sqrt{x^2 - 1}).$$

$$267. \int \csc^{-1} x \, dx = x \csc^{-1} x + \log(x + \sqrt{x^2 - 1}).$$

$$268. \int \text{vers}^{-1} x \, dx = (x - 1) \text{vers}^{-1} x + \sqrt{2x - x^2}.$$

$$269. \int \sin^{-1} \frac{x}{a} \, dx = x \sin^{-1} \frac{x}{a} + \sqrt{a^2 - x^2}.$$

$$270. \int \cos^{-1} \frac{x}{a} \, dx = x \cos^{-1} \frac{x}{a} - \sqrt{a^2 - x^2}.$$

$$271. \int \tan^{-1} \frac{x}{a} \, dx = x \tan^{-1} \frac{x}{a} - \frac{a}{2} \log(a^2 + x^2).$$

$$272. \int \cot^{-1} \frac{x}{a} \, dx = x \cot^{-1} \frac{x}{a} + \frac{a}{2} \log(a^2 + x^2).$$

$$273. \int (\sin^{-1} x)^2 \, dx = x(\sin^{-1} x)^2 - 2x + 2\sqrt{1 - x^2} (\sin^{-1} x).$$

$$274. \int (\cos^{-1} x)^2 \, dx = x(\cos^{-1} x)^2 - 2x - 2\sqrt{1 - x^2} (\cos^{-1} x).$$

$$275. \int x \cdot \sin^{-1} x \, dx = \frac{1}{4} [(2x^2 - 1) \sin^{-1} x + x \sqrt{1 - x^2}].$$

$$276. \int x^n \sin^{-1} x \, dx = \frac{x^{n+1} \sin^{-1} x}{n+1} - \frac{1}{n+1} \int \frac{x^{n+1} \, dx}{\sqrt{1 - x^2}}.$$

$$277. \int x^n \cos^{-1} x \, dx = \frac{x^{n+1} \cos^{-1} x}{n+1} + \frac{1}{n+1} \int \frac{x^{n+1} \, dx}{\sqrt{1 - x^2}}.$$

$$278. \int x^n \tan^{-1} x \, dx = \frac{x^{n+1} \tan^{-1} x}{n+1} - \frac{1}{n+1} \int \frac{x^{n+1} \, dx}{1 + x^2}.$$

$$279. \int \frac{\sin^{-1} x \, dx}{x^2} = \log \left(\frac{1 - \sqrt{1 - x^2}}{x} \right) - \frac{\sin^{-1} x}{x}.$$

$$280. \int \frac{\tan^{-1} x \, dx}{x^2} = \log x - \frac{1}{2} \log(1 + x^2) - \frac{\tan^{-1} x}{x}.$$

INTEGRALS (Continued)

LOGARITHMIC FORMS

- 281. $\int \log x \, dx = x \log x - x.$
282. $\int x \log x \, dx = \frac{x^2}{2} \log x - \frac{x^2}{4}.$
283. $\int x^2 \log x \, dx = \frac{x^3}{3} \log x - \frac{x^3}{9}.$
284. $\int x^p \log (ax) \, dx = \frac{x^{p+1}}{p+1} \log (ax) - \frac{x^{p+1}}{(p+1)^2} [p \neq -1].$
285. $\int (\log x)^2 \, dx = x (\log x)^2 - 2x \log x + 2x.$
286. $\int (\log x)^n \, dx = x (\log x)^n - n \int (\log x)^{n-1} \, dx,$
 $[n \neq -1].$
287. $\int \frac{(\log x)^n}{x} \, dx = \frac{1}{n+1} (\log x)^{n+1}.$
288. $\int \frac{dx}{\log x} = \log (\log x) + \log x + \frac{(\log x)^2}{2 \cdot 2!} + \frac{(\log x)^3}{3 \cdot 3!} + \dots$
289. $\int \frac{dx}{x \log x} = \log (\log x)$
290. $\int \frac{dx}{x (\log x)^n} = - \frac{1}{(n-1) (\log x)^{n-1}}.$
291. $\int \frac{x^m \, dx}{(\log x)^n} = - \frac{x^{m+1}}{(n-1) (\log x)^{n-1}} + \frac{m+1}{n-1} \int \frac{x^m \, dx}{(\log x)^{n-1}}.$
292. $\int x^m \log x \, dx = x^{m+1} \left[\frac{\log x}{m+1} - \frac{1}{(m+1)^2} \right].$
293. $\int x^m (\log x)^n \, dx = \frac{x^{m+1} (\log x)^n}{m+1} - \frac{n}{m+1} \int x^m (\log x)^{n-1} \, dx, [m, n \neq -1].$
294. $\int \sin \log x \, dx = \frac{1}{2} x \sin \log x - \frac{1}{2} x \cos \log x.$
295. $\int \cos \log x \, dx = \frac{1}{2} x \sin \log x + \frac{1}{2} x \cos \log x.$

EXPONENTIAL FORMS

- 296. $\int e^x \, dx = e^x.$
- 297. $\int e^{-x} \, dx = -e^{-x}.$
- 298. $\int e^{ax} \, dx = \frac{e^{ax}}{a}.$
- 299. $\int x e^{ax} \, dx = \frac{e^{ax}}{a^2} (ax - 1).$
300. $\int x^m e^{ax} \, dx = \frac{x^m e^{ax}}{a} - \frac{m}{a} \int x^{m-1} e^{ax} \, dx.$
301. $\int \frac{e^{ax}}{x} \, dx = \log x + \frac{ax}{1!} + \frac{a^2 x^2}{2 \cdot 2!} + \frac{a^3 x^3}{3 \cdot 3!} + \dots$
302. $\int \frac{e^{ax}}{x^m} \, dx = - \frac{1}{m-1} \frac{e^{ax}}{x^{m-1}} + \frac{a}{m-1} \int \frac{e^{ax}}{x^{m-1}} \, dx.$

INTEGRALS (Continued)

$$303. \int e^{ax} \log x \, dx = \frac{e^{ax} \log x}{a} - \frac{1}{a} \int \frac{e^{ax}}{x} \, dx.$$

$$304. \int e^{ax} \cdot \sin px \, dx = \frac{e^{ax} (a \sin px - p \cos px)}{a^2 + p^2}.$$

$$305. \int e^{ax} \cdot \cos px \, dx = \frac{e^{ax} (a \cos px + p \sin px)}{a^2 + p^2}.$$

$$306. \int \frac{dx}{1 + e^x} = x - \log(1 + e^x) = \log \frac{e^x}{1 + e^x}.$$

$$307. \int \frac{dx}{a + be^{px}} = \frac{x}{a} - \frac{1}{ap} \log(a + be^{px}).$$

$$308. \int \frac{dx}{ae^{mx} + be^{-mx}} = \frac{1}{m\sqrt{ab}} \tan^{-1} \left(e^{mx} \sqrt{\frac{a}{b}} \right).$$

$$309. \int e^{ax} \sin px \, dx = \frac{e^{ax} (a \sin px - p \cos px)}{a^2 + p^2}.$$

$$310. \int e^{ax} \cos px \, dx = \frac{e^{ax} (a \cos px + p \sin px)}{a^2 + p^2}.$$

$$311. \int e^{ax} \sin^n bx \, dx = \frac{1}{a^2 + n^2 b^2} \left((a \sin bx - nb \cos bx) e^{ax} \sin^{n-1} bx + n(n-1)b^2 \int e^{ax} \sin^{n-2} bx \cdot dx \right).$$

$$312. \int e^{ax} \cos^n bx \, dx = \frac{1}{a^2 + n^2 b^2} \left((a \cos bx + nb \sin bx) e^{ax} \cos^{n-1} bx + n(n-1)b^2 \int e^{ax} \cos^{n-2} bx \, dx \right).$$

$$313. \int \sinh x \, dx = \cosh x.$$

$$314. \int \cosh x \, dx = \sinh x.$$

$$315. \int \tanh x \, dx = \log \cosh x.$$

$$316. \int \coth x \, dx = \log \sinh x.$$

$$317. \int \operatorname{sech} x \, dx = 2 \tan^{-1}(e^x).$$

$$318. \int \operatorname{csch} x \, dx = \log \tanh \left(\frac{x}{2} \right).$$

$$319. \int x \sinh x \, dx = x \cosh x - \sinh x.$$

$$320. \int x \cosh x \, dx = x \sinh x - \cosh x.$$

$$321. \int \operatorname{sech} x \tanh x \, dx = -\operatorname{sech} x.$$

$$322. \int \operatorname{csch} x \coth x \, dx = -\operatorname{csch} x.$$

DEFINITE INTEGRALS

$$323. \int_0^\infty x^{n-1} e^{-x} \, dx = \int_0^1 \left(\log \frac{1}{x} \right)^{n-1} dx = \Gamma(n).$$

$$324. \Gamma(n), \text{ the gamma function is finite if } n > 0.$$

$$325. \Gamma(n+1) = n\Gamma(n).$$

DEFINITE INTEGRALS (Continued)

$$326. \Gamma(n) \cdot \Gamma(1-n) = \frac{\pi}{\sin n\pi}.$$

$$327. \Gamma(n) = (n-1)! \text{ if } n = \text{integer} > 0.$$

$$328. \Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}.$$

(See values of $\Gamma(n)$ at end of integral table.)

$$329. \int_0^1 x^{m-1} (1-x)^{n-1} dx = \int_0^\infty \frac{x^{m-1} dx}{(1+x)^{m+n}} = \frac{\Gamma(m) \Gamma(n)}{\Gamma(m+n)}.$$

$$330. \int_1^\infty \frac{dx}{x^m} = \frac{1}{m-1}, \quad [m > 1].$$

$$331. \int_0^\infty \frac{dx}{(1+x)x^p} = \pi \csc p\pi, \quad [p < 1].$$

$$332. \int_0^\infty \frac{dx}{(1-x)x^p} = -\pi \cot p\pi, \quad [p < 1].$$

$$333. \int_0^\infty \frac{x^{p-1} dx}{1+x} = \frac{\pi}{\sin p\pi}, \quad [0 < p < 1].$$

$$334. \int_0^\infty \frac{x^{m-1} dx}{1+x^n} = \frac{\pi}{n \sin \frac{m\pi}{n}}, \quad [0 < m < n].$$

$$335. \int_0^\infty \frac{dx}{(1+x)\sqrt{x}} = \pi.$$

$$336. \int_0^\infty \frac{a dx}{a^2 + x^2} = \frac{\pi}{2}, \text{ if } a > 0; 0, \text{ if } a = 0; -\frac{\pi}{2}, \text{ if } a < 0.$$

$$\begin{aligned} 337. \int_0^{\pi/2} \sin^n x dx &= \int_0^{\pi/2} \cos^n x dx \\ &= \frac{1 \cdot 3 \cdot 5 \cdots (n-1)}{2 \cdot 4 \cdot 6 \cdots (n)} \cdot \frac{\pi}{2}, \quad [n \text{ an even integer}], \\ &= \frac{2 \cdot 4 \cdot 6 \cdots (n-1)}{1 \cdot 3 \cdot 5 \cdot 7 \cdots n}, \quad [n \text{ an odd integer}], \\ &= \frac{1}{2} \sqrt{\pi} \frac{\Gamma\left(\frac{n+1}{2}\right)}{\Gamma\left(\frac{n}{2} + 1\right)}, \quad [n > -1]. \end{aligned}$$

$$338. \int_0^\infty \frac{\sin mx dx}{x} = \frac{\pi}{2}, \text{ if } m > 0; 0, \text{ if } m = 0; -\frac{\pi}{2}, \text{ if } m < 0.$$

$$339. \int_0^\infty \frac{\cos x dx}{x} = \infty.$$

$$340. \int_0^\infty \frac{\tan x dx}{x} = \frac{\pi}{2}.$$

DEFINITE INTEGRALS (Continued)

$$341. \int_0^\pi \sin kx \cdot \sin mx \, dx = \int_0^\pi \cos kx \cdot \cos mx \, dx = 0, \\ [k \neq m; m, n = \text{integers}].$$

$$342. \int_0^\infty \frac{\sin x \cos mx \, dx}{x} = 0, \, m < -1 \text{ or } m > 1, \\ = \frac{\pi}{4}, \text{ if } m = \pm 1; = \frac{\pi}{2}, \text{ if } m^2 < 1.$$

$$343. \int_0^\pi \sin^2 mx \, dx = \int_0^\pi \cos^2 mx \, dx = \frac{\pi}{2}.$$

$$344. \int_0^\infty \frac{\sin^2 x \, dx}{x^2} = \frac{\pi}{2}.$$

$$345. \int_0^\infty \frac{\cos mx}{1+x^2} \, dx = \frac{\pi}{2} e^{-m}, \quad [m > 0], \\ = \frac{\pi}{2} e^m, \quad [m < 0].$$

$$346. \int_0^\infty \cos(x^2) \, dx = \int_0^\infty \sin(x^2) \, dx = \frac{1}{2} \sqrt{\frac{\pi}{2}}.$$

$$347. \int_0^\infty \frac{\sin x \, dx}{\sqrt{x}} = \int_0^\infty \frac{\cos x \, dx}{\sqrt{x}} = \sqrt{\frac{\pi}{2}}.$$

$$348. \int_0^{\pi/2} \frac{dx}{1+a \cos x} = \frac{\cos^{-1} a}{\sqrt{1-a^2}}, \quad [a < 1].$$

$$349. \int_0^{2\pi} \frac{dx}{1+a \cos x} = \frac{2\pi}{\sqrt{1-a^2}}, \quad [a^2 < 1].$$

$$350. \int_0^\infty e^{-ax} \, dx = \frac{1}{a}.$$

$$351. \int_0^\infty x^n e^{-ax} \, dx = \frac{\Gamma(n+1)}{a^{n+1}}, \quad [n > -1, a > 0], \\ = \frac{n!}{a^{n+1}}, \quad [n \text{ pos. integ., } a > 0].$$

$$352. \int_0^\infty e^{-a^2 x^2} \, dx = \frac{1}{2a} \sqrt{\pi} = \frac{1}{2a} \Gamma\left(\frac{1}{2}\right), \quad [a > 0].$$

$$353. \int_0^\infty x e^{-x^2} \, dx = \frac{1}{2}.$$

$$354. \int_0^\infty x^2 e^{-x^2} \, dx = \frac{\sqrt{\pi}}{4}.$$

$$355. \int_0^\infty x^{2n} e^{-ax^2} \, dx = \frac{1 \cdot 3 \cdot 5 \cdots (2n-1)}{2^{n+1} a^n} \sqrt{\frac{\pi}{a}}.$$

$$356. \int_0^\infty e^{(-x^2 - a^2/x^2)} \, dx = \frac{e^{-2a} \sqrt{\pi}}{2}.$$

DEFINITE INTEGRALS (Continued)

357. $\int_0^\infty e^{-nx} \sqrt{x} \, dx = \frac{1}{2n} \sqrt{\frac{\pi}{n}}.$
358. $\int_0^\infty \frac{e^{-nx}}{\sqrt{x}} \, dx = \sqrt{\frac{\pi}{n}}.$
359. $\int_0^\infty e^{-ax} \cos mx \, dx = \frac{a}{a^2 + m^2},$ [$a > 0$].
360. $\int_0^\infty e^{-ax} \sin mx \, dx = \frac{m}{a^2 + m^2},$ [$a > 0$].
361. $\int_0^\infty e^{-a^2x^2} \cos bx \, dx = \frac{\sqrt{\pi} \cdot e^{-b^2/4a^2}}{2a},$ [$a > 0$].
362. $\int_0^1 (\log x)^n \, dx = (-1)^n \cdot n!.$
363. $\int_0^1 \left(\log \frac{1}{x}\right)^{\frac{1}{2}} \, dx = \frac{\sqrt{\pi}}{2}.$
364. $\int_0^1 \left(\log \frac{1}{x}\right)^{-\frac{1}{2}} \, dx = \sqrt{\pi}.$
365. $\int_0^1 \left(\log \frac{1}{x}\right)^n \, dx = n!.$
366. $\int_0^1 x \log (1 - x) \, dx = -\frac{3}{4}.$
367. $\int_0^1 x \log (1 + x) \, dx = \frac{1}{4}.$
368. $\int_0^1 \frac{\log x}{1 + x} \, dx = -\frac{\pi^2}{12}.$
369. $\int_0^1 \frac{\log x}{1 - x} \, dx = -\frac{\pi^2}{6}.$
370. $\int_0^1 \frac{\log x}{1 - x^2} \, dx = -\frac{\pi^2}{8}.$
371. $\int_0^1 \log \left(\frac{1 + x}{1 - x}\right) \cdot \frac{dx}{x} = \frac{\pi^2}{4}.$
372. $\int_0^1 \frac{\log x \, dx}{\sqrt{1 - x^2}} = -\frac{\pi}{2} \log 2.$
373. $\int_0^1 x^m \log \left(\frac{1}{x}\right)^n \, dx = \frac{\Gamma(n+1)}{(m+1)^{n+1}},$ if $m+1 > 0,$
 $n+1 > 0.$
374. $\int_0^1 \frac{(x^p - x^q)dx}{\log x} = \log \left(\frac{p+1}{q+1}\right),$ [$p+1 > 0, q+1 > 0$].
375. $\int_0^1 \frac{dx}{\sqrt{\log \left(\frac{1}{x}\right)}} = \sqrt{\pi}.$

DEFINITE INTEGRALS (Continued)

376. $\int_0^\infty \log \left(\frac{e^x + 1}{e^x - 1} \right) dx = \frac{\pi^2}{4}.$
377. $\int_0^\pi x \cdot \log \sin x \, dx = -\frac{\pi^2}{2} \log 2.$
378. $\int_0^{\pi/2} \log \sin x \, dx = \int_0^{\pi/2} \log \cos x \, dx = -\frac{\pi}{2} \cdot \log 2.$
379. $\int_0^{\pi/2} \sin x \log \sin x \, dx = \log 2 - 1.$
380. $\int_0^{\pi/2} \log \tan x \, dx = 0.$
381. $\int_0^\pi \log (a \pm b \cos x) \, dx = \pi \log \left(\frac{a + \sqrt{a^2 - b^2}}{2} \right), [a \geq b].$

GAMMA FUNCTION

$$\text{Values of } \Gamma(n) = \int_0^\infty e^{-x} x^{n-1} dx$$

| n | $\Gamma(n)$ | n | $\Gamma(n)$ | n | $\Gamma(n)$ | n | $\Gamma(n)$ |
|------|-------------|------|-------------|------|-------------|------|-------------|
| 1.00 | 1.00000 | 1.25 | .90640 | 1.50 | .88623 | 1.75 | .91906 |
| 1.01 | .99433 | 1.26 | .90440 | 1.51 | .88659 | 1.76 | .92137 |
| 1.02 | .98884 | 1.27 | .90250 | 1.52 | .88704 | 1.77 | .92376 |
| 1.03 | .98355 | 1.28 | .90072 | 1.53 | .88757 | 1.78 | .92623 |
| 1.04 | .97844 | 1.29 | .89904 | 1.54 | .88818 | 1.79 | .92877 |
| 1.05 | .97350 | 1.30 | .89747 | 1.55 | .88887 | 1.80 | .93138 |
| 1.06 | .96874 | 1.31 | .89600 | 1.56 | .88964 | 1.81 | .93408 |
| 1.07 | .96415 | 1.32 | .89464 | 1.57 | .89049 | 1.82 | .93685 |
| 1.08 | .95973 | 1.33 | .89338 | 1.58 | .89142 | 1.83 | .93969 |
| 1.09 | .95546 | 1.34 | .89222 | 1.59 | .89243 | 1.84 | .94261 |
| 1.10 | .95135 | 1.35 | .89115 | 1.60 | .89352 | 1.85 | .94561 |
| 1.11 | .94739 | 1.36 | .89018 | 1.61 | .89468 | 1.86 | .94869 |
| 1.12 | .94359 | 1.37 | .88931 | 1.62 | .89592 | 1.87 | .95184 |
| 1.13 | .93993 | 1.38 | .88854 | 1.63 | .89724 | 1.88 | .95507 |
| 1.14 | .93642 | 1.39 | .88785 | 1.64 | .89864 | 1.89 | .95838 |
| 1.15 | .93304 | 1.40 | .88726 | 1.65 | .90012 | 1.90 | .96177 |
| 1.16 | .92980 | 1.41 | .88676 | 1.66 | .90167 | 1.91 | .96523 |
| 1.17 | .92670 | 1.42 | .88636 | 1.67 | .90330 | 1.92 | .96878 |
| 1.18 | .92373 | 1.43 | .88604 | 1.68 | .90500 | 1.93 | .97240 |
| 1.19 | .92088 | 1.44 | .88580 | 1.69 | .90678 | 1.94 | .97610 |
| 1.20 | .91817 | 1.45 | .88565 | 1.70 | .90864 | 1.95 | .97988 |
| 1.21 | .91558 | 1.46 | .88560 | 1.71 | .91057 | 1.96 | .98374 |
| 1.22 | .91311 | 1.47 | .88563 | 1.72 | .91258 | 1.97 | .98768 |
| 1.23 | .91075 | 1.48 | .88575 | 1.73 | .91466 | 1.98 | .99171 |
| 1.24 | .90852 | 1.49 | .88595 | 1.74 | .91683 | 1.99 | .99581 |
| | | | | | | 2.00 | 1.00000 |

ALGEBRA

Factors and Expansions

$$(a \pm b)^2 = a^2 \pm 2ab + b^2.$$

$$(a \pm b)^3 = a^3 \pm 3a^2b + 3ab^2 \pm b^3.$$

$$(a \pm b)^4 = a^4 \pm 4a^3b + 6a^2b^2 \pm 4ab^3 + b^4.$$

$$a^2 - b^2 = (a - b)(a + b).$$

$$a^2 + b^2 = (a + b\sqrt{-1})(a - b\sqrt{-1}).$$

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2).$$

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2).$$

$$a^4 + b^4 = (a^2 + ab\sqrt{2} + b^2)(a^2 - ab\sqrt{2} + b^2).$$

$$a^n - b^n = (a - b)(a^{n-1} + a^{n-2}b + \dots + b^{n-1}).$$

$$a^n + b^n = (a + b)(a^{n-1} - a^{n-2}b + \dots - b^{n-1}),$$

$$a^n + b^n = (a + b)(a^{n-1} - a^{n-2}b + \dots + b^{n-1}), \quad \text{for even values of } n.$$

$$\text{for odd values of } n.$$

$$a^4 + a^2b^2 + b^4 = (a^2 + ab + b^2)(a^2 - ab + b^2).$$

$$(a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2ac + 2bc.$$

$$(a + b + c)^3 = a^3 + b^3 + c^3 + 3a^2(b + c) + 3b^2(a + c) +$$

$$3c^2(a + b) + 6abc$$

$$(a + b + c + d + \dots)^2 = a^2 + b^2 + c^2 + d^2 + \dots +$$

$$2a(b + c + d + \dots) + 2b(c + d + \dots) + 2c(d + \dots) + \dots$$

See also under Series

Powers and Roots

$$a^x \times a^y = a^{(x+y)}.$$

$$\frac{a^x}{a^y} = a^{(x-y)}.$$

$$a^0 = 1 \text{ [if } a \neq 0]. \quad (ab)^x = a^x b^x.$$

$$a^{-x} = \frac{1}{a^x}.$$

$$\left(\frac{a}{b}\right)^x = \frac{a^x}{b^x}.$$

$$(a^x)^y = a^{xy}.$$

$$a^{\frac{1}{x}} = \sqrt[x]{a}.$$

$$\sqrt[x]{ab} = \sqrt[x]{a} \sqrt[x]{b}.$$

$$\sqrt[x]{\sqrt[y]{a}} = \sqrt[xy]{a}.$$

$$a^{\frac{x}{y}} = \sqrt[y]{a^x}.$$

$$\sqrt[x]{\frac{a}{b}} = \frac{\sqrt[x]{a}}{\sqrt[x]{b}}.$$

Proportion

If $\frac{a}{b} = \frac{c}{d},$

then

$$\frac{a+b}{b} = \frac{c+d}{d},$$

$$\frac{a-b}{b} = \frac{c-d}{d},$$

$$\frac{a-b}{a+b} = \frac{c-d}{c+d}.$$

ALGEBRA—(Continued)

SUMS OF NUMBERS

The sum of the first n numbers,—

$$\Sigma(n) = 1 + 2 + 3 + 4 + 5 \dots + n = \frac{n(n+1)}{2}$$

The sum of the squares of the first n numbers,

$$\Sigma(n^2) = 1^2 + 2^2 + 3^2 + 4^2 + 5^2 \dots + n^2 = \frac{n(n+1)(2n+1)}{6}$$

The sum of the cubes of the first n numbers,

$$\Sigma(n^3) = 1^3 + 2^3 + 3^3 + 4^3 + 5^3 \dots + n^3 = \frac{n^2(n+1)^2}{4}$$

ARITHMETICAL PROGRESSION

If a is the first term; l , the last term; d , the common difference; n , the number of terms and s , the sum of n terms,—

$$l = a + (n - 1)d \quad s = \frac{n}{2}(a + l)$$

$$s = \frac{n}{2} \left\{ 2a + (n-1)d \right\}$$

GEOMETRICAL PROGRESSION

If a is the first term; l , the last term; r , the common ratio; n , the number of terms and s , the sum of n terms,—

$$l = ar^{n-1} \quad s = a \frac{(1 - r^n)}{1 - r}$$

$$s = a \frac{(r^n - 1)}{r - 1} \quad s = \frac{lr - a}{r - 1}$$

If n is infinity and r^2 less than unity,—

$$s = \frac{a}{1 - r}$$

FACTORIALS

$$[n = n! = e^{-n} n^n \sqrt{2\pi n}, \text{ approximately.}]$$

PERMUTATIONS

If M denote the number of permutations of n things taken p at a time,—

$$M = n(n-1)(n-2) \dots (n-p+1)$$

COMBINATIONS

If M denote the number of combinations of n things taken p at a time,—

$$M = \frac{n(n-1)(n-2) \dots (n-p+1)}{p!}$$

$$M = \frac{n!}{p!(n-p)!}$$

ALGEBRA (Continued)

Quadratic Equations

Any quadratic equation may be reduced to the form, —
 $ax^2 + bx + c = 0$

$$\text{Then } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}.$$

- If $b^2 - 4ac$ is positive the roots are real and unequal.
 If $b^2 - 4ac$ is zero the roots are real and equal.
 If $b^2 - 4ac$ is negative the roots are imaginary and unequal.
 If $b^2 - 4ac$ is a perfect square the roots are rational and unequal.

Cubic Equations

A cubic equation, $y^3 + py^2 + qy + r = 0$ may be reduced to the form, —

$$x^3 + ax + b = 0$$

by substituting for y the value, $\left(x - \frac{p}{3}\right)$. Here

$$a = \frac{1}{3}(3q - p^2) \text{ and } b = \frac{1}{27}(2p^3 - 9pq + 27r).$$

For solution let, —

$$A = \sqrt[3]{-\frac{b}{2} + \sqrt{\frac{b^2}{4} + \frac{a^3}{27}}}, \quad B = \sqrt[3]{-\frac{b}{2} - \sqrt{\frac{b^2}{4} + \frac{a^3}{27}}},$$

then the values of x will be given by,

$$x = A + B, \quad -\frac{A+B}{2} + \frac{A-B}{2}\sqrt{-3}, \quad -\frac{A+B}{2} - \frac{A-B}{2}\sqrt{-3}$$

If $\frac{b^2}{4} + \frac{a^3}{27} > 0$, there will be one real root and two conjugate imaginary roots.

If $\frac{b^2}{4} + \frac{a^3}{27} = 0$, there will be three real roots of which two at least are equal

If $\frac{b^2}{4} + \frac{a^3}{27} < 0$, there will be three real and unequal roots.

In the last case a trigonometric solution is useful. Compute the value of the angle ϕ in the expression, —

$$\cos \phi = -\frac{b}{2} \div \sqrt{\left(-\frac{a^3}{27}\right)},$$

then x will have the following values:—

$$2\sqrt{-\frac{a}{3}} \cos \frac{\phi}{3}, \quad 2\sqrt{-\frac{a}{3}} \cos\left(\frac{\phi}{3} + 120^\circ\right),$$

$$2\sqrt{-\frac{a}{3}} \cos\left(\frac{\phi}{3} + 240^\circ\right).$$

APPROXIMATIONS

If a and b are small quantities, the following relations are approximately true,—

$$(1 \pm a)^m = 1 \pm ma,$$

$$(1 \pm a)^m (1 \pm b)^n = 1 \pm ma \pm nb.$$

If n is nearly equal to m ,

$$\sqrt{mn} = \frac{n+m}{2}, \text{ approximately.}$$

If θ is a very small angle expressed in radians,—

$$\frac{\sin \theta}{\theta} = 1 \text{ and } \frac{\tan \theta}{\theta} = 1, \text{ approximately.}$$

SERIES

The expression in parentheses following certain of the series indicates the region of convergence. If not otherwise indicated it is to be understood that the series converges for all finite values of x .

BINOMIAL

$$(x+y)^n = x^n + nx^{n-1}y + \frac{n(n-1)}{2!} x^{n-2}y^2 +$$

$$\frac{n(n-1)(n-2)}{3!} x^{n-3}y^3 + \dots (y^2 < x^2)$$

$$(1 \pm x)^n = 1 \pm nx + \frac{n(n-1)x^2}{2!} \pm \frac{n(n-1)(n-2)x^3}{3!} + \dots \text{etc.} \quad (x^2 < 1)$$

$$(1 \pm x)^{-n} = 1 \mp nx + \frac{n(n+1)x^2}{2!} \mp \frac{n(n+1)(n+2)x^3}{3!} + \dots \text{etc.} \quad (x^2 < 1)$$

$$(1 \pm x)^{-1} = 1 \mp x + x^2 \mp x^3 + x^4 \mp x^5 + \dots \quad (x^2 < 1)$$

$$(1 \pm x)^{-2} = 1 \mp 2x + 3x^2 \mp 4x^3 + 5x^4 \mp 6x^5 + \dots \quad (x^2 < 1)$$

TAYLOR'S SERIES

$$f(x+h) = f(x) + hf'(x) + \frac{h^2}{2!} f''(x) + \frac{h^3}{3!} f'''(x) + \dots$$

$$= f(h) + xf'(h) + \frac{x^2}{2!} f''(h) + \frac{x^3}{3!} f'''(h) + \dots$$

MACLAURIN'S SERIES

$$f(x) = f(0) + xf'(0) + \frac{x^2}{2!} f''(0) + \frac{x^3}{3!} f'''(0) + \dots$$

EXPONENTIAL

$$e = 1 + \frac{1}{1} + \frac{1}{2!} + \frac{1}{3!} + \frac{1}{4!} + \dots$$

$$e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} + \dots$$

$$a^x = 1 + x \log a + \frac{(x \log a)^2}{2!} + \frac{(x \log a)^3}{3!} + \dots$$

SERIES (Continued)

LOGARITHMIC

$$\log_e x = \frac{x-1}{x} + \frac{1}{2} \left(\frac{x-1}{x} \right)^2 + \frac{1}{3} \left(\frac{x-1}{x} \right)^3 + \dots \quad (x > \frac{1}{2})$$

$$\log_e x = (x-1) - \frac{1}{2}(x-1)^2 + \frac{1}{3}(x-1)^3 - \dots \quad (2 > x > 0)$$

$$\log_e x = 2 \left[\frac{x-1}{x+1} + \frac{1}{3} \left(\frac{x-1}{x+1} \right)^3 + \frac{1}{5} \left(\frac{x-1}{x+1} \right)^5 + \dots \right] \quad (x > 0)$$

$$\log_e(1+x) = x - \frac{1}{2}x^2 + \frac{1}{3}x^3 - \frac{1}{4}x^4 + \dots \quad (-1 < x < 1)$$

$$\log_e(n+1) - \log_e(n-1) = 2 \left[\frac{1}{n} + \frac{1}{3n^3} + \frac{1}{5n^5} + \dots \right]$$

$$\log_e(a+x) = \log_e a + 2 \left[\frac{x}{2a+x} + \frac{1}{3} \left(\frac{x}{2a+x} \right)^3 + \frac{1}{5} \left(\frac{x}{2a+x} \right)^5 + \dots \right] \quad (a > 0, -a < x < +\infty)$$

TRIGONOMETRIC

$$\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$$

$$\cos x = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \dots$$

$$\tan x = x + \frac{x^3}{3} + \frac{2x^5}{15} + \frac{17x^7}{315} + \frac{62x^9}{2835} + \dots \quad \left(x^2 < \frac{\pi^2}{4} \right)$$

$$\sin^{-1}x = x + \frac{x^3}{6} + \frac{1}{2} \cdot \frac{3}{4} \cdot \frac{x^5}{5} + \frac{1}{2} \cdot \frac{3}{4} \cdot \frac{5}{6} \cdot \frac{x^7}{7} + \dots \quad (x^2 < 1)$$

$$\tan^{-1}x = x - \frac{1}{3}x^3 + \frac{1}{5}x^5 - \frac{1}{7}x^7 + \dots \quad (x^2 < 1)$$

$$= \frac{\pi}{2} - \frac{1}{x} + \frac{1}{3x^3} - \frac{1}{5x^5} + \dots \quad (x^2 > 1)$$

$$\log_e \sin x = \log_e x - \frac{x^2}{6} - \frac{x^4}{180} - \frac{x^6}{2835} - \dots \quad (x^2 < \pi^2)$$

$$\log_e \cos x = -\frac{x^2}{2} - \frac{x^4}{12} - \frac{x^6}{45} - \frac{17x^8}{2520} - \dots \quad \left(x^2 < \frac{\pi^2}{4} \right)$$

$$\log_e \tan x = \log_e x + \frac{x^2}{3} + \frac{7x^4}{90} + \frac{62x^6}{2835} + \dots \quad \left(x^2 < \frac{\pi^2}{4} \right)$$

$$e^{\sin x} = 1 + x + \frac{x^2}{2!} - \frac{3x^4}{4!} - \frac{8x^5}{5!} - \frac{3x^6}{6!} + \frac{56x^7}{7!} + \dots$$

$$e^{\cos x} = e \left(1 - \frac{x^2}{2!} + \frac{4x^4}{4!} - \frac{31x^6}{6!} + \dots \right)$$

$$e^{\tan x} = 1 + x + \frac{x^2}{2!} + \frac{3x^3}{3!} + \frac{9x^4}{4!} + \frac{37x^5}{5!} + \dots \quad \left(x^2 < \frac{\pi^2}{4} \right)$$

MISCELLANEOUS

The Sum (Σ , = Sigma) and Product (Π , = Pi) Notations

Σ denotes the sum, and Π , the product of all quantities of a given collection. In particular,

$\sum_{i=m}^{m+n} x_i$ means $x_m + x_{m+1} + \dots + x_{m+n}$, ($n + 1$ terms in all),

$\prod_{i=m}^{m+n} x_i$ means $x_m x_{m+1} \dots x_{m+n}$, ($n + 1$ factors in all).

For indicated range, R , (such as $m \leq i \leq m + n$), one may write $\sum_R x_i$, $\prod_R x_i$, respectively. Where the range is clear from

the context one writes Σx_i , Πx_i , or even Σx , Πx , respectively. For c a constant and for x_i and y_i with common range (say of n elements),

$$\Sigma c x_i = c \Sigma x_i, \quad \Sigma (x_i + y_i) = \Sigma x_i + \Sigma y_i, \quad \Sigma (x_i + c) = nc + \Sigma x_i.$$

Special Numerical Relations

(i) For range, $i = 1, 2, \dots, n$, with $x_i = i$.

$$\Sigma x_i = n(n+1)/2, \quad \Sigma (2x_i - 1) = n^2,$$

$$\Sigma x_i^2 = n(n+1)(2n+1)/6.$$

$$\Sigma x_i^3 = (\Sigma x_i)^2, \quad \Sigma x_i^4 = (\Sigma x_i^2)[6(\Sigma x_i) - 1]/5.$$

$$\Pi (c + 1 - x_i) = c^{(n)}, \quad \Pi x_i = n^{(n)} = n! \text{ ("factorial } n").$$

Hence $n! = n \cdot (n-1)! \cdot 0!$ is defined to be 1.

Stirling's formula (used for n large),

$$\sqrt{2n\pi} (n/e)^n < n! < \sqrt{2n\pi} (n/e)^n \left(1 + \frac{1}{12n-1}\right),$$

$$(\pi = 3.14159 \dots, e = 2.71828 \dots).$$

$n!/(n-m)!$ gives the number of permutations of n distinct things taken m at a time.

(ii) For range, $i = -\left(\frac{n-1}{2}\right), -\left(\frac{n-1}{2}\right) + 1, \dots,$
 $\left(\frac{n-1}{2}\right) - 1, \left(\frac{n-1}{2}\right)$, with

$x_i = i$ (whether n is odd or even),

$$\sum x_i = \sum x_i^3 = 0, \quad \sum x_i^2 = \frac{n(n^2-1)}{12}, \quad \sum x_i^4 = \frac{3n^2-7}{20} \sum x_i^2.$$

(iii) The Binomial Coefficients, $\binom{n}{m}$.

$\binom{n}{m} = n! / [(n-m)!m!]$, for integers $m, n, 0 \leq m \leq n$. $\binom{n}{0} = \binom{n}{n} = 1$.

$(x+c)^n = \sum_r \binom{n}{r} x^{n-r} c^r$, ($0 \leq r \leq n$), the binomial expansion. $\binom{n}{m}$ gives also the number of combinations of n distinct things taken m at a time.

$\binom{n}{m} + \binom{n}{m+1} = \binom{n+1}{m+1}$, recursion relation for binomial coefficients.

$$\binom{n}{n-m} = \binom{n}{m}, \sum_r (-1)^r \binom{n}{r} = 0, \sum_r \binom{n}{r}^2 = \binom{2n}{n}, \sum_{s=m}^n \binom{s}{m} = \binom{n+1}{m+1}.$$

Table of Binomial Coefficients

| n | $\binom{n}{0}$ | $\binom{n}{1}$ | $\binom{n}{2}$ | $\binom{n}{3}$ | $\binom{n}{4}$ | $\binom{n}{5}$ | $\binom{n}{6}$ | $\binom{n}{7}$ | $\binom{n}{8}$ | $\binom{n}{9}$ | $\binom{n}{10}$ |
|-----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|
| 0 | 1 | | | | | | | | | | |
| 1 | 1 | 1 | | | | | | | | | |
| 2 | 1 | 2 | 1 | | | | | | | | |
| 3 | 1 | 3 | 3 | 1 | | | | | | | |
| 4 | 1 | 4 | 6 | 4 | 1 | | | | | | |
| 5 | 1 | 5 | 10 | 10 | 5 | 1 | | | | | |
| 6 | 1 | 6 | 15 | 20 | 15 | 6 | 1 | | | | |
| 7 | 1 | 7 | 21 | 35 | 35 | 21 | 7 | 1 | | | |
| 8 | 1 | 8 | 28 | 56 | 70 | 56 | 28 | 8 | 1 | | |
| 9 | 1 | 9 | 36 | 84 | 126 | 126 | 84 | 36 | 9 | 1 | |
| 10 | 1 | 10 | 45 | 120 | 210 | 252 | 210 | 120 | 45 | 10 | 1 |
| 11 | 1 | 11 | 55 | 165 | 330 | 462 | 462 | 330 | 165 | 55 | 11 |
| 12 | 1 | 12 | 66 | 220 | 495 | 792 | 924 | 792 | 495 | 220 | 66 |
| 13 | 1 | 13 | 78 | 286 | 715 | 1287 | 1716 | 1716 | 1287 | 715 | 286 |
| 14 | 1 | 14 | 91 | 364 | 1001 | 2002 | 3003 | 3432 | 3003 | 2002 | 1001 |
| 15 | 1 | 15 | 105 | 455 | 1365 | 3003 | 5005 | 6435 | 6435 | 5005 | 3003 |
| 16 | 1 | 16 | 120 | 560 | 1820 | 4368 | 8008 | 11440 | 12870 | 11440 | 8008 |
| 17 | 1 | 17 | 136 | 680 | 2380 | 6188 | 12376 | 19448 | 24310 | 24310 | 19448 |
| 18 | 1 | 18 | 153 | 816 | 3060 | 8568 | 18564 | 31824 | 43758 | 48620 | 43758 |
| 19 | 1 | 19 | 171 | 969 | 3876 | 11628 | 27132 | 50388 | 75582 | 92378 | 92378 |
| 20 | 1 | 20 | 190 | 1140 | 4845 | 15504 | 38760 | 77520 | 125970 | 167960 | 184756 |

NOTE: $\binom{n}{m} = \frac{n(n-1)(n-2) \dots (n-m+1)}{m(m-1)(m-2) \dots 3.2.1}$; $\binom{n}{0} = 1$; $\binom{n}{1} = n$.

For coefficients missing from the above table, use the relation

$$\binom{n}{m} = \binom{n}{n-m}, \text{ e.g. } \binom{20}{11} = \binom{20}{9} = 167960.$$

ALGEBRA (Continued)

Finite Differences

For equi-spaced arguments x_i , and associated y_i , the successive advancing y -differences are, $\Delta^0 y_i = y_i$, $\Delta y_i = y_{i+1} - y_i$, $\Delta^2 y_i = \Delta y_{i+1} - \Delta y_i = y_{i+2} - 2y_{i+1} + y_i$, ..., $\Delta^m y_i = \Delta^{m-1} y_{i+1} - \Delta^{m-1} y_i = \sum_r (-1)^r \binom{m}{r} y_{i+m-r}$. With arbitrary origin A and

class-interval length, $x_{i+1} - x_i = h$, using $u_i = (x_i - A)/h$, write $y(u_i)$ for y_i . Then if for some fixed m , for the portion of the table considered, the values of $\Delta^{m+1} y_i$ be zero (or approximately, if these be regarded as negligible) Newton's formula gives

$$y(u) = \sum_r \frac{u^{(r)}}{r!} \Delta^r y(0) = y(0) + u \Delta y(0) + \frac{u(u-1)}{1 \cdot 2} \Delta^2 y(0) + \dots + \frac{u(u-1) \dots (u-m+1)}{m!} \Delta^m y(0).$$

This formula reduces to an identity for $u = u_0, u_1, \dots, u_n$, ($u_i = i$), and may be used to interpolate for intermediate values.

Example. Given

| | |
|-----|------------------------------------|
| x | -4, -2, 0, 2, 4, 6, 8, ... |
| y | 10, 14, 30, 64, 122, 210, 334, ... |

to find a value for y when $x = 10$, and when $x = 1$. Suppose for some reason A has been taken at $x = 2$. The work may be arranged as follows:

| u | x | y | Δ | Δ^2 | Δ^3 | Δ^4 |
|-----|-----|-----|----------|------------|------------|------------|
| -3 | -4 | 10 | | | | |
| | | | 4 | | | |
| -2 | -2 | 14 | | 12 | | |
| | | | 16 | | 6 | |
| -1 | 0 | 30 | | 18 | | 0 |
| | | | 34 | | 6 | |
| 0 | 2 | 64 | | 24 | | 0 |
| | | | 58 | | 6 | |
| 1 | 4 | 122 | | 30 | | 0 |
| | | | 88 | | 6 | |
| 2 | 6 | 210 | | 36 | | — |
| | | | 124 | | — | |
| 3 | 8 | 334 | | — | | — |
| | | | — | | — | |
| — | — | — | | — | | — |

$$y(u) = 64 + 58u + 30 \frac{u(u-1)}{1 \cdot 2} + 6 \frac{u(u-1)(u-2)}{1 \cdot 2 \cdot 3}$$

$$= 64 + 58u + 15u(u-1) + u(u-1)(u-2).$$

At $x = 10$, $u = 4$. Substituting $u = 4$, one has $y|_{x=10} = 500$.
At $x = 1$, $u = -\frac{1}{2}$. Substituting $u = -\frac{1}{2}$, one has $y|_{x=1} = 44\frac{1}{8}$.

STATISTICS

Central Measures

Here the range of i is from 1 to n . With each value x_i is associated a weighting factor $f_i \geq 0$ (such as the frequency, the probability, the mass, the reliability, or other multiplier).

N , the total weight, $= \sum f_i$.

\bar{x} , the arithmetic mean, $= \sum f_i x_i / N = \sum f_i x_i / \sum f_i$.

GM , the geometric mean (available when each x_i is positive),
 $= \sqrt[N]{\prod x_i^{f_i}}$. $\text{Log } GM = \sum f_i \log x_i / N$.

Mo , the mode, = value among (x_1, \dots, x_n) having maximum associated f_i (usually obtained by interpolating after the data are graduated). For unweighted items, x_i , a mode is a value about which the values of x_i cluster most densely.

RMS , the root-mean-square, $= \sqrt{\sum f_i x_i^2 / N}$.

Md , the median (see below). For unweighted items, the median is the value, equaled or exceeded by exactly half of the values x_i in the given list. In case of a central pair, the median is usually taken as the arithmetic mean of this pair.

Mm , the mid-mean (see below). For unweighted items, the mid-mean is the arithmetic mean of the half-list obtained upon dropping out the highest quarter and lowest quarter of the items.

Cum $f|_X$, the value of "cumulative f " at X , $= \sum_{x_i < X} f_i$ (interpolation being used for X if necessary).

The M-Tiles

For ungrouped data, X is called the r th m -tile (or r th m -tile mark) ($r = 0, 1, \dots, m$) if simultaneously, $\sum_{x_i < X} f_i / N \leq r/m$,

and $\sum_{x_i > X} f_i / N \leq (m - r)/m$. In particular the zeroth m -tile is **min**, the minimal value among the list (x_1, \dots, x_n) , and the m th m -tile is **max**, the maximal value among the list.

For grouped data, the r th m -tile mark, X , is such that

$$\text{Cum } f|_X = Nr/m, \quad (r = 0, 1, 2, \dots, m).$$

$$\text{Cum } f|_{\min} = 0, \quad \text{Cum } f|_{\max} = N.$$

In particular, certain intermediate ($0 < r < m$) m -tile marks are named as follows:

| m | $r = 1$ | 2 | 3 | ... |
|-----|---------------------------|-----------------------|------------------------|------|
| 2 | Md (median) | | | |
| 3 | T_1 (lower tertile) | T_2 (upper tertile) | | |
| 4 | Q_1 (lower quartile) | Md | Q_3 (upper quartile) | |
| 10 | D_1 (first decile) | D_2 | D_3 | etc. |
| 100 | PC_1 (first percentile) | PC_2 | PC_3 | etc. |

STATISTICS (Continued)

The term "rth m-tile" ($r = 1, \dots, m$) is also used to denote the class interval extending from the $(r - 1)$ st to rth m -tile mark as defined above.

Mm , the mid-mean, =

$$2 \sum_{Q_1 \leq x_i \leq Q_3} f_i x_i / N = \sum_{Q_1 \leq x_i \leq Q_3} f_i x_i / \sum_{Q_1 \leq x_i \leq Q_3} f_i.$$

When each x_i is positive, and not all are equal, one always has $0 < \min < GM < \bar{x} < RMS < \max$.

For moderately-skewed distributions, one has approximately $Mo - \bar{x} = 3(Md - \bar{x})$, or $3Md = Mo + 2\bar{x}$.

Measures of Dispersion and Skewness

Here A is an arbitrary reference value, usually a convenient integral measure near \bar{x} .

ν_k , k th moment about A , = $\Sigma f_i (x_i - A)^k / N$, ($k = 0, 1, \dots$).

$\nu_0 = 1$, $\nu_1 = \bar{x} - A$. ν_2 as function of A is minimum for $A = \bar{x}$.

μ_k , k th moment about \bar{x} , = $\Sigma f_i (x_i - \bar{x})^k / N$, ($k = 0, 1, \dots$).

$$\mu_0 = 1,$$

$$\mu_1 = 0,$$

$$\mu_2 = \nu_2 - \nu_1^2 \text{ } (\mu_2 = \text{variance}),$$

$$\mu_3 = \nu_3 - 3\nu_1\nu_2 + 2\nu_1^3,$$

$$\mu_4 = \nu_4 - 4\nu_1\nu_3 + 6\nu_1^2\nu_2 - 3\nu_1^4.$$

$$\beta_1 = \mu_3^2 / \mu_2^3, \beta_2 = \mu_4 / \mu_2^2.$$

σ , standard deviation, = $\sqrt{\mu_2}$.

$\alpha_3/2$, momental skewness; $\alpha_3 = \sqrt{\beta_1} = \mu_3/\sigma^3$.

$(\alpha_4 - 3)/2$, kurtosis; $\alpha_4 = \beta_2$.

MD , mean deviation (from the mean), = $\Sigma f_i |x_i - \bar{x}| / N$
 = $2 \left[\bar{x} \sum_{x_i < \bar{x}} f_i - \sum_{x_i < \bar{x}} f_i x_i \right] / N$. (This latter form is convenient for computation.)

s , quartile deviation, = $|Q_3 - Q_1|/2$.

$P.E.$, probable error, = 0.6745σ .

V , coefficient of variation, = $100\sigma/\bar{x} \%$.

Pearson's measure of skewness = $(\bar{x} - Mo)/\sigma$. (Usually approximately $\alpha_3/2$.)

Bowley's measure of skewness = $(Q_3 - 2Md + Q_1)/(2s)$.

(Bowley's measure of skewness lies between -1 and $+1$.)

STATISTICS (Continued)

The Class Interval

$$\Delta x_i = x_{i+1} - x_i.$$

For equi-spaced arguments, $\Delta x_i = h$, the length of the class interval, x_i is the mid-value or class mark. The interval from $x_i - (h/2)$ to $x_i + (h/2)$ is the class interval with these as given initial and terminal end values.

$$\begin{aligned} u_i &= (x_i - A)/h. \\ \bar{u} &= \sum f_i u_i / N, \quad \bar{x} = h\bar{u} + A. \\ (\mu_k)_x &= h^k (\mu_k)_u, \quad (k = 0, 1, \dots). \\ \sigma_u^2 &= [\sum f_i u_i^2 / N] - \bar{u}^2, \quad \sigma_x = h\sigma_u. \\ (\beta_1)_x &= (\beta_1)_u, \quad (\beta_2)_x = (\beta_2)_u. \end{aligned}$$

Sheppard's corrections (to correct approximately for the error due to treating all elements in a given class interval of length h as though concentrated at the class mark).

For μ_0, μ_1, μ_3 , no corrections.

In x -units,
 corrected $(\mu_2)_x = \text{uncorrected } (\mu_2)_x - h^2/12$,
 corrected $(\mu_4)_x = \text{uncorrected } (\mu_4)_x - h^2 \text{ uncorrected } (\mu_2)_x/2 + 7h^4/240$.

In u -units, replace h by 1 in the formulae given above.

Least Squares

The normal equations for finding coefficients, a_0, a_1, \dots, a_m , in fitting a curve of the form $y = a_0 + a_1x + \dots + a_mx^m$ to data $(X_i, Y_i), i = 1, \dots, n, (n > m)$, are $m + 1$ in number as follows:

$$\begin{aligned} \sum Y_i &= a_0 n + a_1 \sum X_i + a_2 \sum X_i^2 + \dots + a_m \sum X_i^m, \\ \sum X_i Y_i &= a_0 \sum X_i + a_1 \sum X_i^2 + a_2 \sum X_i^3 + \dots + a_m \sum X_i^{m+1}, \\ \sum X_i^m Y_i &= a_0 \sum X_i^m + a_1 \sum X_i^{m+1} + a_2 \sum X_i^{m+2} + \dots + a_m \sum X_i^{2m}. \end{aligned}$$

Deviation from fitted curve,

$$d_i = Y_i - (a_0 + a_1 X_i + \dots + a_m X_i^m).$$

$$\sum d_i^2 = \sum Y_i^2 - (a_0 \sum Y_i + a_1 \sum X_i Y_i + \dots + a_m \sum X_i^m Y_i).$$

For $z = ab^x$, use $y = \log z, a_0 = \log a, a_1 = \log b$.

For $z = at^x$, use $y = \log z, a_0 = \log a, a_1 = p, x = \log t$.

S_y , standard error of estimate, = root-mean-square of the y -deviations about a fitted curve = $\sqrt{\sum d_i^2 / n}$.

Simple Correlation

PRODUCT MOMENT METHOD

Given n equi-spaced measurements $X_i, i = 1, 2, \dots, n$, with $h = X_{i+1} - X_i, x_i = X_i - \bar{X}$; and m equi-spaced measurements $Y_j, j = 1, 2, \dots, m$, with $k = Y_{j+1} - Y_j, y_j = Y_j - \bar{Y}$; and a weight (frequency, probability, etc.) $e_{ij} (\geq 0)$, associated with (X_i, Y_j) . Here e_{ij} is an entry in the table.

STATISTICS (Continued)

$$f_i = \sum_j e_{ij}, g_j = \sum_i e_{ij}.$$

$$N = \sum_{ij} e_{ij} = \sum_i f_i = \sum_j g_j. \quad (\text{Check})$$

$$\bar{x} = \sum_{ij} e_{ij} X_i / N = \sum_i f_i X_i / N; \bar{y} = \sum_{ij} e_{ij} Y_j / N = \sum_j g_j Y_j / N.$$

Let A and B be arbitrary reference values, usually convenient integral measures near \bar{X} and \bar{Y} , respectively.

$$u_i = (X_i - A)/h, v_j = (Y_j - B)/k;$$

$$\bar{u} = \sum f_i u_i / N, \bar{X} = h\bar{u} + A, \bar{v} = \sum g_j v_j / N, \bar{Y} = k\bar{v} + B.$$

$$\sigma_u^2 = (\mu_2)_u = (\sum f_i u_i^2 / N) - \bar{u}^2, \sigma_x = h\sigma_u, \sigma_v^2 = (\mu_2)_v = (\sum g_j v_j^2 / N) - \bar{v}^2, \sigma_y = k\sigma_v. \quad \text{Apply Sheppard's corrections.}$$

$$U_j = \sum_i e_{ij} u_i, V_i = \sum_j e_{ij} v_j, P = \sum u_i V_i = \sum v_j U_j. \quad (\text{Check})$$

$$p_{uv} = \sum_{ij} e_{ij} (u_i - \bar{u})(v_j - \bar{v}) / N$$

$$= (\bar{P} / N) - \bar{u}\bar{v}.$$

$$p_{xy} = hkp_{uv}.$$

$r = p_{uv} / (\sigma_u \sigma_v) = p_{xy} / (\sigma_x \sigma_y)$ (product-moment) coefficient of correlation. In every case $-1 \leq r \leq 1$.

$$Y - \bar{Y} = r \frac{\sigma_y}{\sigma_x} (X - \bar{X}), \text{ or } y = r \frac{\sigma_y}{\sigma_x} x, \text{ regression line of } y \text{ on } x.$$

$$X - \bar{X} = r \frac{\sigma_x}{\sigma_y} (Y - \bar{Y}), \text{ or } x = r \frac{\sigma_x}{\sigma_y} y, \text{ regression line of } x \text{ on } y.$$

Example of Computation for Product-Moment Coefficient of Correlation

| u_i | | -3 | -2 | -1 | 0 | 1 | 2 | | | | U_j | |
|---|-------|-------|-----|----|----|----|----|-------|--|-------------|-------------------------|----|
| | | | | | | | | | | | $(= \sum_i e_{ij} u_i)$ | |
| v_j | y_j | x_i | | | | | | g_j | $g_j v_j$ | $g_j v_j^2$ | $v_j U_j$ | |
| 2 | 21 | | | 1 | 5 | 7 | 1 | 14 | 28 | 56 | 8 | 16 |
| 1 | 18 | | 1 | 3 | 7 | 5 | 2 | 18 | 18 | 18 | 4 | 4 |
| 0 | 15 | | 2 | 3 | 4 | 1 | | 10 | 0 | 0 | 0 | 0 |
| -1 | 12 | | 3 | 1 | 1 | | | 5 | -5 | 5 | -7 | 7 |
| -2 | 9 | 2 | 1 | | | | | 3 | -6 | 12 | -8 | 16 |
| f_i | | 2 | 7 | 8 | 17 | 13 | 3 | 50 | 35 | 91 | | 43 |
| $f_i u_i$ | | -6 | -14 | -8 | 0 | 13 | 6 | -9 | $A = 24, B = 15,$ $h = 4, k = 3,$ $N = \sum f_i = \sum g_j = 50,$ $\sum f_i u_i = -9, \sum g_j v_j = 35,$ $\sum f_i u_i^2 = 79, \sum g_j v_j^2 = 91,$ $P = \sum u_i V_i = \sum v_j U_j = 43.$ | | | |
| $f_i u_i^2$ | | 18 | 28 | 8 | 0 | 13 | 12 | 79 | | | | |
| $V_i, (= \sum_j e_{ij} v_j)$ | | -4 | -4 | 4 | | 19 | 4 | | | | | |
| $u_i V_i$ | | 12 | 8 | -4 | 0 | 19 | 8 | 43 | | | | |
| | | | | | | | | | | | | |
| $\bar{u} = -\frac{9}{50} = -.18 \quad \bar{v} = \frac{35}{50} = .70$ | | | | | | | | | | | | |
| $\sigma_u^2 = (\frac{79}{50}) - (.18)^2 = .083 = 1.46, \quad \sigma_u = 1.083$ | | | | | | | | | | | | |
| $\sigma_v^2 = (\frac{91}{50}) - (.70)^2 = .083 = 1.247, \quad \sigma_v = 1.117$ | | | | | | | | | | | | |
| $p_{uv} = (\frac{43}{50}) - (-.18)(.70) = +0.986$ | | | | | | | | | | | | |
| $r = +0.986 / (1.21 \times 1.117) = +.725$ | | | | | | | | | | | | |
| Ans. $r = +.815$ | | | | | | | | | | | | |

STATISTICS (Continued)

RANK DIFFERENCE METHOD

Given n corresponding pairs of measured items (X_i, Y_i) , ($i = 1, \dots, n$). Let (u_i, v_i) be the corresponding rank numbers. Here $u_i = 1$ for the largest X_i , 2 for the next largest X_i , etc., and similarly $v_i = 1$ for the largest Y_i , 2 for the next largest Y_i , etc. $\rho = 1 - \frac{6 \sum (u_i - v_i)^2}{n(n^2 - 1)}$, (rank difference)

coefficient of correlation. In every case $-1 \leq \rho \leq 1$. Check: $\sum (u_i - v_i) = 0$.

Example of Computation for Rank-Difference Coefficient of Correlation

| X_i | Y_i | u_i | v_i | $u_i - v_i$ | $(u_i - v_i)^2$ | |
|----------|-------|-------|-------|-------------|-----------------|---|
| 76 | 52 | 3 | 1 | +2 | 4 | Check: $\sum (u_i - v_i) = 0$. $\rho = 1 - \frac{6 \times 62}{10(10^2 - 1)}$ $= +0.63$ Ans. $\rho = +.63$ |
| 66 | 34 | 8 | 9 | -1 | 1 | |
| 63 | 32 | 10 | 10 | 0 | 0 | |
| 74 | 45 | 4 | 4 | 0 | 0 | |
| 79 | 50 | 1 | 2 | -1 | 1 | |
| 69 | 37 | 7 | 7 | 0 | 0 | |
| 77 | 35 | 2 | 8 | -6 | 36 | |
| 65 | 42 | 9 | 5 | +4 | 16 | |
| 71 | 40 | 6 | 6 | 0 | 0 | |
| 73 | 48 | 5 | 3 | +2 | 4 | |
| $N = 10$ | | | | 0 | 62 | |

Probability

If among $a + b$ equi-probable and mutually exclusive events, a are regarded as favorable and b unfavorable, then for a single trial

$$p, \text{ probability of favorable outcome, } = \frac{a}{a + b},$$

$$q, \text{ probability of unfavorable outcome, } = 1 - p = \frac{b}{a + b}.$$

The successive terms in the binomial expansion $(p + q)^n = \sum_r \binom{n}{r} p^{n-r} q^r$ give the respective probabilities that in n trials, the event will be favorable exactly $n - r$ times, $r = 0, \dots, n$.

The mean number of favorable events is np , of unfavorable, nq ; the standard deviation is $\sigma = \sqrt{npq}$, $\alpha_z = (p - q)/\sigma$ (the positive direction being that of increasing unfavorability).

Normal curve (x measured in σ -units from the mean, and with area = 1):

$$y = \frac{1}{\sqrt{2\pi}} e^{-x^2/2} = 0.3989 e^{-x^2/2}.$$

STATISTICS (Continued)

MD (mean deviation from the mean) = $\sigma\sqrt{2/\pi} = 0.7979\sigma$.

s (quartile deviation from the mean) = $0.6745\sigma = 0.845 MD$.

Percentage areas, under normal curve, for successive class intervals measured from the mean:

Multiples of σ : 34 %, 14 %, 2 %.

Multiples of s : 25 %, 16 %, 7 %, 2 %.

Normal surface (x measured in σ_x -units y in σ_y -units from their means),

$$z = \frac{1}{2\pi\sqrt{1-r^2}} e^{-(x^2-2rxy+y^2)/[2(1-r^2)]}.$$

Goodness of Fit. For a universe of objects falling into n mutually exclusive classes with class marks, x_i ($i = 1, 2, \dots, n$), let p_i be the probability for the i th class. Given a sample of N items, with f_i items in the i th class ($\Sigma f_i = N$), the probability that a random sample of N items gives no better fit, expressed in terms of n and χ^2 ("Chi square"), = $\Sigma(f_i - Np_i)^2/(Np_i)$, is given by a table, portions of which are as follows:

Probability that a Random Sample Gives no Better Fit

| χ^2 n | 1 | 2 | 3 | 4 | 6 | 8 | 10 | 15 | 20 |
|-----------------|-------|------|------|------|------|------|------|------|------|
| 3 | .607 | .368 | .223 | .135 | .050 | .018 | .007 | .001 | .000 |
| 4 | .801 | .572 | .392 | .261 | .112 | .046 | .019 | .002 | .000 |
| 5 | .910 | .736 | .558 | .406 | .199 | .092 | .040 | .005 | .000 |
| 6 | .963 | .849 | .700 | .549 | .306 | .156 | .075 | .010 | .001 |
| 7 | .986 | .920 | .809 | .677 | .423 | .238 | .125 | .020 | .003 |
| 8 | .995 | .960 | .885 | .780 | .540 | .333 | .189 | .036 | .006 |
| 9 | .998 | .981 | .934 | .857 | .647 | .433 | .265 | .059 | .010 |
| 10 | .999 | .991 | .964 | .911 | .740 | .534 | .350 | .091 | .018 |
| 11 | 1.000 | .996 | .981 | .947 | .815 | .629 | .440 | .132 | .029 |
| 12 | 1.000 | .998 | .991 | .970 | .873 | .713 | .530 | .182 | .045 |

| χ^2 n | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 25 | 30 |
|-----------------|------|------|------|------|------|------|------|------|------|
| 10 | .534 | .350 | .213 | .122 | .067 | .035 | .018 | .003 | .000 |
| 11 | .629 | .440 | .285 | .173 | .100 | .055 | .029 | .005 | .001 |
| 12 | .713 | .530 | .363 | .233 | .141 | .082 | .045 | .009 | .002 |
| 13 | .785 | .616 | .446 | .301 | .191 | .116 | .067 | .015 | .003 |
| 14 | .844 | .694 | .528 | .374 | .249 | .158 | .095 | .023 | .005 |
| 15 | .889 | .762 | .606 | .450 | .313 | .207 | .130 | .035 | .008 |
| 16 | .924 | .820 | .679 | .526 | .382 | .263 | .172 | .050 | .012 |
| 17 | .949 | .867 | .744 | .599 | .453 | .324 | .220 | .070 | .018 |
| 18 | .967 | .904 | .800 | .667 | .524 | .389 | .274 | .095 | .026 |
| 19 | .979 | .932 | .847 | .729 | .593 | .456 | .333 | .125 | .037 |
| 20 | .987 | .953 | .886 | .784 | .657 | .522 | .395 | .161 | .052 |

MENSURATION FORMULÆ

Plane Figures Bounded by Straight Lines

The area of a triangle whose base is b and altitude h

$$= \frac{hb}{2}.$$

The area of a triangle with angles A , B , and C and sides opposite a , b , and c , respectively

$$= \frac{1}{2}ab \sin C.$$

or

$$= \sqrt{s(s-a)(s-b)(s-c)},$$

where $s = \frac{1}{2}(a + b + c)$.

A rectangle with sides a and b has an area $= ab$.

The area of a parallelogram with side b and the perpendicular distance to the parallel side h

$$= bh.$$

The area of a parallelogram with sides a and b and the included angle θ

$$= ab \sin \theta.$$

The area of a rhombus with diagonals c and d ,

$$= \frac{1}{2}cd.$$

The area of a trapezoid whose parallel sides are a and b and altitude h

$$= \frac{1}{2}(a + b)h.$$

The area of any quadrilateral with diagonals a and b and the angle between them θ

$$= \frac{1}{2}ab \sin \theta.$$

The area of a regular polygon with n sides, each of length l ,

$$= \frac{1}{4}nl^2 \cot \frac{180}{n}.$$

For a regular polygon of n sides, each side of length l , the radius of the inscribed circle,

$$= \frac{l}{2} \cot \frac{180}{n}.$$

The radius of the circumscribed circle,

$$= \frac{l}{2} \operatorname{cosec} \frac{180}{n}.$$

MENSURATION FORMULAE (Continued)

Area, Radius of Inscribed and Circumscribed Circles for Regular Polygons

l = length of one side.

| Name. | Number of sides. | Area. | Radius of inscribed circle. | Radius of circumscribed circle. |
|-----------------------|------------------|---------------|-----------------------------|---------------------------------|
| Triangle, equilateral | 3 | $0.43301l^2$ | $0.28867l$ | $0.57735l$ |
| Square..... | 4 | $1.00000l^2$ | $0.50000l$ | $0.70710l$ |
| Pentagon..... | 5 | $1.72048l^2$ | $0.68819l$ | $0.85065l$ |
| Hexagon..... | 6 | $2.59808l^2$ | $0.86602l$ | $1.0000l$ |
| Heptagon..... | 7 | $3.63391l^2$ | $1.0383l$ | $1.1523l$ |
| Octagon..... | 8 | $4.82843l^2$ | $1.2071l$ | $1.3065l$ |
| Nonagon..... | 9 | $6.18182l^2$ | $1.3737l$ | $1.4619l$ |
| Decagon..... | 10 | $7.69421l^2$ | $1.5388l$ | $1.6180l$ |
| Undecagon..... | 11 | $9.36564l^2$ | $1.7028l$ | $1.7747l$ |
| Dodecagon..... | 12 | $11.19615l^2$ | $1.8660l$ | $1.9318l$ |

Radius of circle inscribed in any triangle, whose sides are a , b , and c , where $s = \frac{1}{2}(a + b + c)$

$$= \frac{\sqrt{s(s-a)(s-b)(s-c)}}{s}$$

The radius of the circumscribed circle

$$= \frac{abc}{4\sqrt{s(s-a)(s-b)(s-c)}}$$

The perimeter of a polygon inscribed in a circle of radius r , where n is the number of sides,

$$= 2nr \sin \frac{\pi}{n}. \quad (\pi \text{ radians} = 180^\circ)$$

The area of the inscribed polygon,

$$= \frac{1}{2}nr^2 \sin \frac{2\pi}{n}.$$

The perimeter of a polygon circumscribed about a circle of radius r , number of sides n

$$= 2nr \tan \frac{\pi}{n}.$$

The area of the circumscribed polygon

$$= nr^2 \tan \frac{\pi}{n}.$$

MENSURATION FORMULÆ (Continued)

Plane Figures Bounded by Curved Lines

The circumference of a circle whose radius is r and diameter d ($d = 2r$)

$$= 2\pi r = \pi d. \quad (\pi = 3.14159)$$

The area of a circle

$$= \pi r^2 = \frac{1}{4}\pi d^2 = .7854d^2.$$

The length of an arc of a circle for an arc of θ degrees

$$= \frac{\pi r \theta}{180}.$$

NOTE. — In this and following similar formulæ r denotes the radius of the circle, (OC , Fig. 1).

For an arc of θ radians the length

$$= r\theta.$$

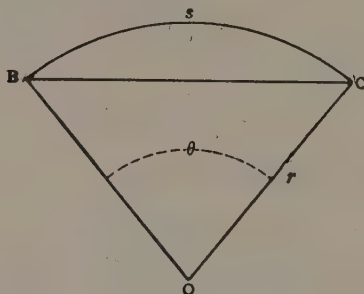


FIG. 1.

The length of a chord subtending an angle θ

$$= 2r \sin \frac{1}{2}\theta.$$

The area of a sector where θ is the angle between the radii in degrees

$$= \frac{\pi r^2 \theta}{360}.$$

If s is the length of the arc, the area of the sector

$$= \frac{sr}{2}.$$

The area of a segment where θ is the angle between the two radii in degrees

$$= \frac{\pi r^2 \theta}{360} - \frac{r^2 \sin \theta}{2}.$$

MENSURATION FORMULAE (Continued)

If θ is in radians the area $= \frac{1}{2}r^2(\theta - \sin \theta)$.

The area of the segment of a circle

$$= \frac{\pi r^2}{2} - \left[x \sqrt{r^2 - x^2} + r^2 \sin^{-1} \left(\frac{x}{r} \right) \right]$$

where r is the radius of the circle and x the perpendicular distance of the chord from the center. The angle must be expressed in radians.

The area of the ring between two circles of radius r_1 and r_2 , one of which encloses the other,

$$= \pi (r_1 + r_2) (r_1 - r_2).$$

The two circles are not necessarily concentric.

Area of the sector of an annulus. (Fig. 2.)—If angle $GOH = \theta$ and the lines GO and $JO = r_1$ and r_2 respectively, the area $GHIJ = \frac{1}{2}\theta(r_1 + r_2)(r_1 - r_2)$.

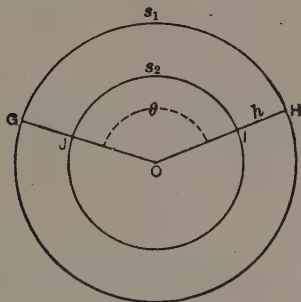


Fig. 2

If s_1 = the length of the arc GH and s_2 = the arc JI and $h = HI = r_1 - r_2$, the area $GHIJ = \frac{1}{2}h(s_1 + s_2)$.

The circumference of an ellipse whose semiaxes are a and b

$$= 2\pi \sqrt{\frac{a^2 + b^2}{2}}, \text{ approximately.}$$

The area of an ellipse $= \pi ab$.

The length of the arc of a parabola, as arc SPQ in Fig. 3, where $x = PR$, and $y = QR$

$$= 2\sqrt{y^2 + \frac{4x^2}{3}}, \text{ approximately.}$$

The area of the section of the parabola $PQRS$, $= \frac{4}{3}xy$.

MENSURATION FORMULAE (Continued)

Solids Bounded by Planes

The lateral area of a regular prism = perimeter of a right section \times the length.

The volume of a regular prism = area of base \times the altitude.

The lateral area of a regular pyramid, slant height l , length of one side of base a , and n number of sides n ,

$$= \frac{1}{2}nal.$$

The volume of a pyramid = $\frac{1}{3}$ area of base \times altitude.

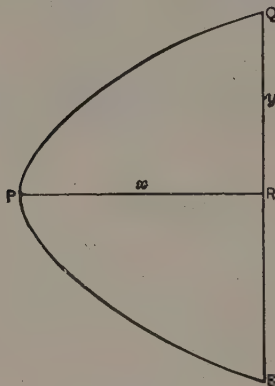


FIG. 3.

Surface and Volume of Regular Polyhedra

Surface and volume of regular polyhedra in terms of the length of one edge l .

| Name. | Nature of surface. | Surface. | Volume. |
|--------------------|--------------------------|---------------|--------------|
| Tetrahedron... | 4 equilateral triangles | $1.73205l^2$ | $0.11785l^3$ |
| Hexahedron or cube | 6 squares..... | $6.00000l^2$ | $1.00000l^3$ |
| Octahedron... | 8 equilateral triangles | $3.46410l^2$ | $0.47140l^3$ |
| Dodecahedron | 12 pentagons..... | $20.64573l^2$ | $7.66312l^3$ |
| Icosahedron... | 20 equilateral triangles | $8.66025l^2$ | $2.18170l^3$ |

Solids Bounded by Curved Surfaces

The surface of a sphere of radius r and diameter $d(=2r)$

$$= 4\pi r^2 = \pi d^2 = 12.57r^2.$$

The volume of a sphere

$$= \frac{4}{3}\pi r^3 = \frac{1}{6}\pi d^3 = 4.189r^3.$$

MENSURATION FORMULAE (Continued)

The area of a lune on the surface of a sphere of radius r , included between two great circles whose inclination is θ radians.

$$= 2r^2\theta.$$

The area of a spherical triangle whose angles are A , B , and C (radians) on a sphere of radius r

$$= (A + B + C - \pi)r^2.$$

The area of a spherical polygon of n sides where θ is the sum of its angles in radians

$$= [\theta - (n - 2)\pi]r^2.$$

The area of the curved surface of a spherical segment of height h , radius of sphere r

$$= 2\pi rh.$$

The volume of a spherical segment, data as above

$$= \frac{1}{3}\pi h^2 (3r - h).$$

If a = radius of the base of the segment, the volume

$$= \frac{1}{6}\pi h (h^2 + 3a^2).$$

The curved surface of a right cylinder where r = the radius of the base and h , the altitude,

$$= 2\pi rh.$$

The volume of a cylinder, data as above,

$$= \pi r^2 h.$$

The curved surface of a right cone whose altitude is h and radius of base r

$$= \pi r \sqrt{r^2 + h^2}.$$

The volume of a cone, data as above,

$$= \frac{\pi}{3} r^2 h = 1.047 r^2 h.$$

The curved surface of the frustum of a right cone, radius of base r_1 , of top r_2 and altitude h ,

$$= \pi(r_1 + r_2) \sqrt{h^2 + (r_1 - r_2)^2}.$$

The volume of the frustum of a cone, data as above,

$$= \pi \frac{h}{3} (r_1^2 + r_1 r_2 + r_2^2).$$

The oblate spheroid is formed by the rotation of an ellipse about its minor axis. If a and b are the major and minor semi-axes respectively, and e the eccentricity, the surface

$$= 2\pi a^2 + \pi \frac{b^2}{e} \log_e \frac{1+e}{1-e},$$

and volume = $\frac{4}{3}\pi a^2 b$.

MENSURATION FORMULAE (Continued)

The prolate spheroid is formed by the rotation of an ellipse about its major axis ($2a$), data as above.

$$\text{Surface} \qquad \qquad \qquad = 2\pi b^2 + 2\pi \frac{ab}{e} \sin^{-1} e,$$

$$\text{volume} \qquad \qquad \qquad = \frac{4}{3} \pi ab^2.$$

SIMPSON'S RULE FOR IRREGULAR AREAS

Divide the area into an even number ($2m$) of panels by means of $2m+1$ parallel lines, drawn at constant distance h apart; and denote the lengths of the intercepted segments by $y_0, y_1, \dots, y_{2m-1}, y_{2m}$. The first and last of these may be zero. The area will then be

$$A = \frac{1}{3} h [(y_0 + y_{2m}) + 4(y_1 + y_3 + \dots + y_{2m-1}) + 2(y_2 + y_4 + \dots + y_{2m-2})]$$

While the formula is exact in many simple cases, ordinarily the formula provides only an approximation, for which the accuracy increases with an increase in the number of divisions. Simpson's Rule may be applied to finding volumes, if the measures y_0, y_1, \dots, y_{2m} be interpreted as the areas of parallel plane sections at constant distance h apart.

PRISMOIDAL FORMULA

As a special case where $m=1$, and H , ($=2h$) is the distance between two limiting parallel planes, one has for the volume of a solid figure,

$$V = \frac{1}{3} H (S_0 + 4S_1 + S_2).$$

Here S_0 and S_2 are the cross-sectional areas in these limiting planes (lower and upper bases, respectively), and S_1 is the cross section of the mid-section. The formula is exact for the cone, sphere, ellipsoid, and prismoid.

TRIGONOMETRIC FORMULAE

TRIGONOMETRIC FUNCTIONS IN A RIGHT-ANGLED TRIANGLE

If A , B , and C are the vertices (C the right angle), and a , b , and h the sides opposite respectively,

$$\text{sine } A = \sin A = \frac{a}{h}, \quad \text{cosine } A = \cos A = \frac{b}{h},$$

$$\text{tangent } A = \tan A = \frac{a}{b}, \quad \text{cotangent } A = \cot A = \text{ctn } A = \frac{b}{a},$$

$$\text{secant } A = \sec A = \frac{h}{b}, \quad \text{cosecant } A = \csc A = \frac{h}{a}.$$

$$\text{exsecant } A = \text{exsec } A = \sec A - 1$$

$$\text{versine } A = \text{vers } A = 1 - \cos A$$

$$\text{coversine } A = \text{covers } A = 1 - \sin A$$

$$\text{haversine } A = \text{hav } A = \frac{1}{2} \text{vers } A$$

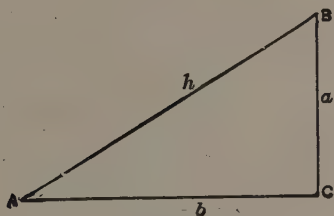


FIG. 4.

SIGNS AND LIMITS OF VALUE ASSUMED BY THE FUNCTIONS

| Function. | Quadrant I. | | Quadrant II. | | Quadrant III. | | Quadrant IV. | |
|-----------|-------------|--------|--------------|--------|---------------|--------|--------------|--------|
| | Sign. | Value. | Sign. | Value. | Sign. | Value. | Sign. | Value. |
| sin..... | + | 0 to 1 | + | 1 to 0 | - | 0 to 1 | - | 1 to 0 |
| cos..... | + | 1 to 0 | - | 0 to 1 | - | 1 to 0 | + | 0 to 1 |
| tan..... | + | 0 to ∞ | - | ∞ to 0 | + | 0 to ∞ | - | ∞ to 0 |
| cot..... | + | ∞ to 0 | - | 0 to ∞ | + | ∞ to 0 | - | 0 to ∞ |
| sec..... | + | 1 to ∞ | - | ∞ to 1 | - | 1 to ∞ | + | ∞ to 1 |
| cosec.... | + | ∞ to 1 | + | 1 to ∞ | - | ∞ to 1 | - | 1 to ∞ |

TRIGONOMETRIC FORMULAE (Continued)

VALUE OF THE FUNCTIONS OF VARIOUS ANGLES

| | 0° | 30° | 45° | 60° | 90° | 180° | 270° |
|----------|----------|-----------------------|-----------------------|-----------------------|----------|----------|----------|
| sin..... | 0 | $\frac{1}{2}$ | $\frac{1}{2}\sqrt{2}$ | $\frac{1}{2}\sqrt{3}$ | 1 | 0 | -1 |
| cos..... | 1 | $\frac{1}{2}\sqrt{3}$ | $\frac{1}{2}\sqrt{2}$ | $\frac{1}{2}$ | 0 | -1 | 0 |
| tan..... | 0 | $\frac{1}{3}\sqrt{3}$ | 1 | $\sqrt{3}$ | ∞ | 0 | ∞ |
| cot..... | ∞ | $\sqrt{3}$ | 1 | $\frac{1}{3}\sqrt{3}$ | 0 | ∞ | 0 |

RELATIONS OF THE FUNCTIONS

$$\sin x = \frac{1}{\operatorname{cosec} x}.$$

$$\operatorname{cosec} x = \frac{1}{\sin x}.$$

$$\cos x = \frac{1}{\sec x}.$$

$$\sec x = \frac{1}{\cos x}.$$

$$\tan x = \frac{1}{\cot x} = \frac{\sin x}{\cos x}.$$

$$\sin^2 x + \cos^2 x = 1$$

$$\cot x = \frac{1}{\tan x} = \frac{\cos x}{\sin x}.$$

$$1 + \tan^2 x = \sec^2 x$$

$$1 + \cot^2 x = \operatorname{cosec}^2 x$$

$$\sin x = \sqrt{1 - \cos^2 x}.$$

$$\cos x = \sqrt{1 - \sin^2 x}.$$

$$\tan x = \sqrt{\sec^2 x - 1}.$$

$$\sec x = \sqrt{\tan^2 x + 1}.$$

$$\cot x = \sqrt{\operatorname{cosec}^2 x - 1}.$$

$$\operatorname{cosec} x = \sqrt{\cot^2 x + 1}.$$

$$\sin x = \cos (90 - x) = \sin (180 - x).$$

$$\cos x = \sin (90 - x) = -\cos (180 - x).$$

$$\tan x = \cot (90 - x) = -\tan (180 - x).$$

$$\cot x = \tan (90 - x) = -\cot (180 - x).$$

$$\operatorname{cosec} x = \cot \frac{x}{2} - \cot x.$$

FUNCTIONS OF SUMS OF ANGLES

$$\sin (x + y) = \sin x \cos y + \cos x \sin y.$$

$$\sin (x - y) = \sin x \cos y - \cos x \sin y.$$

$$\cos (x + y) = \cos x \cos y - \sin x \sin y.$$

$$\cos (x - y) = \cos x \cos y + \sin x \sin y.$$

$$\tan (x + y) = \frac{\tan x + \tan y}{1 - \tan x \tan y}.$$

$$\tan (x - y) = \frac{\tan x - \tan y}{1 + \tan x \tan y}.$$

TRIGONOMETRIC FORMULAE (Continued)

FUNCTIONS OF MULTIPLE ANGLES

$$\sin 2x = 2 \sin x \cos x.$$

$$\cos 2x = \cos^2 x - \sin^2 x = 2 \cos^2 x - 1 = 1 - 2 \sin^2 x.$$

$$\sin 3x = 3 \sin x - 4 \sin^3 x.$$

$$\cos 3x = 4 \cos^3 x - 3 \cos x.$$

$$\sin 4x = 8 \cos^3 x \sin x - 4 \cos x \sin x.$$

$$\cos 4x = 8 \cos^4 x - 8 \cos^2 x + 1.$$

$$\sin 5x = 5 \sin x - 20 \sin^3 x + 16 \sin^5 x.$$

$$\cos 5x = 16 \cos^5 x - 20 \cos^3 x + 5 \cos x.$$

$$\sin 6x = 32 \cos^5 x \sin x - 32 \cos^3 x \sin x + 6 \cos x \sin x.$$

$$\cos 6x = 32 \cos^6 x - 48 \cos^4 x + 18 \cos^2 x - 1.$$

$$\tan 2x = \frac{2 \tan x}{1 - \tan^2 x}.$$

$$\cot 2x = \frac{\cot^2 x - 1}{2 \cot x}.$$

$$\tan 3x = \frac{3 \tan x - \tan^3 x}{1 - 3 \tan^2 x}.$$

$$\sin \frac{1}{2}x = \pm \sqrt{\frac{1 - \cos x}{2}}.$$

$$\cos \frac{1}{2}x = \pm \sqrt{\frac{1 + \cos x}{2}}.$$

$$\tan \frac{1}{2}x = \pm \sqrt{\frac{1 - \cos x}{1 + \cos x}} = \frac{1 - \cos x}{\sin x} = \frac{\sin x}{1 + \cos x}.$$

MISCELLANEOUS RELATIONS

$$\sin x \pm \sin y = 2 \sin \frac{1}{2}(x \pm y) \cdot \cos \frac{1}{2}(x \mp y).$$

$$\cos x + \cos y = 2 \cos \frac{1}{2}(x + y) \cdot \cos \frac{1}{2}(x - y).$$

$$\cos x - \cos y = -2 \sin \frac{1}{2}(x + y) \cdot \sin \frac{1}{2}(x - y).$$

$$\tan x \pm \tan y = \frac{\sin(x \pm y)}{\cos x \cdot \cos y}, \quad \cot x \pm \cot y = \frac{\pm \sin(x \pm y)}{\sin x \cdot \sin y}.$$

$$\frac{1 + \tan x}{1 - \tan x} = \tan(45^\circ + x) \quad \frac{\cot x + 1}{\cot x - 1} = \cot(45^\circ - x)$$

$$\frac{\sin x \pm \sin y}{\cos x + \cos y} = \tan \frac{1}{2}(x \pm y).$$

$$\frac{\sin x \pm \sin y}{\cos x - \cos y} = -\cot \frac{1}{2}(x \mp y).$$

$$\frac{\sin x + \sin y}{\sin x - \sin y} = \frac{\tan \frac{1}{2}(x + y)}{\tan \frac{1}{2}(x - y)}.$$

$$\sin^2 x - \sin^2 y = \sin(x + y) \sin(x - y).$$

$$\cos^2 x - \cos^2 y = -\sin(x + y) \sin(x - y).$$

$$\cos^2 x - \sin^2 y = \cos(x + y) \cos(x - y).$$

TRIGONOMETRIC FORMULAE (Continued)

RELATIONS BETWEEN SIDES AND ANGLES OF ANY PLANE TRIANGLE

In a triangle with angles A , B , and C and sides opposite a , b , and c respectively,

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = \text{diameter of the circumscribed circle.}$$

$$a^2 = b^2 + c^2 - 2bc \cos A.$$

$$a = b \cos C + c \cos B.$$

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}.$$

$$\tan \frac{A - B}{2} = \frac{a - b}{a + b} \cot \frac{C}{2}.$$

$$\sin A = \frac{2}{bc} \sqrt{s(s-a)(s-b)(s-c)},$$

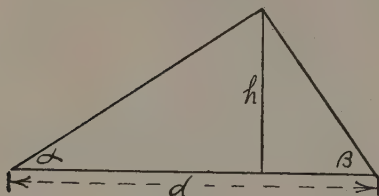
where $s = \frac{1}{2}(a+b+c)$ and $r = \sqrt{\frac{(s-a)(s-b)(s-c)}{s}}.$

$$\sin \frac{A}{2} = \sqrt{\frac{(s-b)(s-c)}{bc}}.$$

$$\cos \frac{A}{2} = \sqrt{\frac{s(s-a)}{bc}}.$$

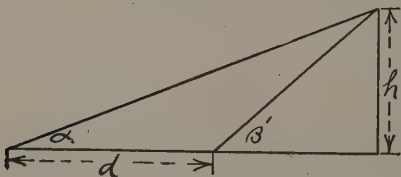
$$\tan \frac{A}{2} = \sqrt{\frac{(s-b)(s-c)}{s(s-a)}} = \frac{r}{s-a}.$$

$$\frac{a+b}{a-b} = \frac{\sin A + \sin B}{\sin A - \sin B} = \frac{\tan \frac{1}{2}(A+B)}{\tan \frac{1}{2}(A-B)} = \frac{\cot \frac{1}{2}C}{\tan \frac{1}{2}(A-B)}.$$



$$h = d \frac{\sin \alpha \sin \beta}{\sin (\alpha + \beta)} = \frac{d}{\cot \alpha + \cot \beta}$$

Similarly



$$h = d \frac{\sin \alpha \sin \beta'}{\sin (\beta' - \alpha)} = \frac{d}{\cot \alpha - \cot \beta'}$$

FIG. 5.

RELATIONS IN ANY SPHERICAL TRIANGLE

If A , B and C be the three angles and a , b , and c the opposite sides,

$$\frac{\sin A}{\sin a} = \frac{\sin B}{\sin b} = \frac{\sin C}{\sin c}.$$

$$\cos a = \cos b \cos c + \sin b \sin c \cos A = \frac{\cos b \cos (c \pm \theta)}{\cos \theta}.$$

where $\tan \theta = \tan b \cos A$.

$$\cos A = -\cos B \cos C + \sin B \sin C \cos a.$$

$$\sin \frac{1}{2} A = \sqrt{\frac{\sin (s-b) \sin (s-c)}{\sin b \sin c}}.$$

where $s = \frac{1}{2}(a+b+c)$.

$$\cos \frac{1}{2} A = \sqrt{\frac{\sin s \sin (s-a)}{\sin b \sin c}}.$$

$$\tan \frac{1}{2} A = \frac{r}{\sin (s-a)}.$$

where $r = \sqrt{\frac{\sin (s-a) \sin (s-b) \sin (s-c)}{\sin s}}.$

$$\cos \frac{1}{2} a = \sqrt{\frac{\cos (S-B) \cos (S-C)}{\sin B \sin C}}.$$

where $S = \frac{1}{2}(A+B+C)$.

$$\sin \frac{1}{2} a = \sqrt{\frac{\cos S \cos (S-A)}{\sin B \sin C}}.$$

$$\tan \frac{1}{2} a = R \cos (S-A)$$

where $R = \sqrt{\frac{-\cos S}{\cos (S-A) \cos (S-B) \cos (S-C)}}$

$$\frac{\tan \frac{a+b}{2}}{\tan \frac{c}{2}} = \frac{\cos \frac{A-B}{2}}{\cos \frac{A+B}{2}}, \quad \frac{\tan \frac{A+B}{2}}{\cot \frac{C}{2}} = \frac{\cos \frac{a-b}{2}}{\cos \frac{a+b}{2}}.$$

$$\frac{\tan \frac{a-b}{2}}{\tan \frac{c}{2}} = \frac{\sin \frac{A-B}{2}}{\sin \frac{A+B}{2}}, \quad \frac{\tan \frac{A-B}{2}}{\cot \frac{C}{2}} = \frac{\sin \frac{a-b}{2}}{\sin \frac{a+b}{2}}.$$

$$\text{hav } a = \text{hav } (b \sim c) + \sin b \sin c \text{ hav } A$$

$$\text{hav } A = \frac{\sqrt{\text{hav } [a + (b \sim c)] \text{ hav } [a - (b \sim c)]}}{\sin b \sin c}$$

ANALYTICAL GEOMETRY

The distance between two points x_1, y_1 , and x_2, y_2 , — rectangular coördinates:

$$d = \pm \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

For polar coördinates and points r_1, θ_1 , and r_2, θ_2 :

$$d = \pm \sqrt{r_1^2 + r_2^2 - 2r_1r_2 \cos (\theta_1 - \theta_2)}$$

The area of a triangle whose vertices are $x_1, y_1; x_2, y_2$, and x_3, y_3 :

$$A = \frac{1}{2}(x_1y_2 - x_2y_1 + x_2y_3 - x_3y_2 + x_3y_1 - x_1y_3)$$

For polar coördinates and vertices, $r_1, \theta_1; r_2, \theta_2$, and r_3, θ_3 :

$$A = \frac{1}{2}\{(r_1r_2 \sin (\theta_2 - \theta_1) + r_2r_3 \sin (\theta_3 - \theta_2) + r_3r_1 \sin (\theta_1 - \theta_3))\}$$

The equation of a straight line where m is the tangent of the angle of inclination and c , the distance of intersection with the Y axis from the origin:

$$y = mx + c$$

If a line of slope m passes through the point x_1, y_1 its equation is:

$$y - y_1 = m(x - x_1)$$

The equation of a line through the points x_1, y_1 , and x_2, y_2 is:

$$\frac{y - y_1}{y_2 - y_1} = \frac{x - x_1}{x_2 - x_1}$$

If the intercepts on the X and Y axes are a and b respectively, the equation is:

$$\frac{x}{a} + \frac{y}{b} = 1$$

If the length of the perpendicular from the origin is p and its angle of inclination θ the equation is:

$$x \cos \theta + y \sin \theta = p$$

General equation of the straight line:

$$Ax + By + C = 0$$

The equation of a circle whose center is at a, b , and whose radius is c :

$$(x - a)^2 + (y - b)^2 = c^2$$

If the origin is at the center:

$$x^2 + y^2 = c^2$$

The polar equation of a circle with the origin on the circumference and its center at point c, a :

$$r = 2c \cos (\theta - a).$$

If the origin is not on the circumference, the radius a and the center at a point l, a , the equation becomes:

$$a^2 = r^2 + l^2 - 2rl \cos (\theta - a)$$

ANALYTICAL GEOMETRY (Continued)

The equation of a parabola with the origin at the vertex, where f is the distance from the focus to the vertex:

$$y^2 = 4fx$$

If p is the semi-latus rectum ($=2f$) the equation is:

$$y^2 = 2px$$

The polar equation where the pole is at the focus and p the semi-latus rectum is:

$$r = \frac{p}{1 - \cos \theta}$$

If the pole is at the vertex and p as above:

$$r = \frac{2p \cos \theta}{\sin^2 \theta}$$

The equation of the ellipse with the origin at the center and semi-axes a and b :

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

Polar equation where the pole is at the center:

$$r^2 = \frac{a^2 b^2}{a^2 \sin^2 \theta + b^2 \cos^2 \theta}$$

The equation of the hyperbola with the origin at the center, semi-axes a and b :

$$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$$

Polar equation, pole at center:

$$r^2 = \frac{a^2 b^2}{a^2 \sin^2 \theta - b^2 \cos^2 \theta}$$

HYPERBOLIC FUNCTIONS

Definitions

An hyperbolic function represents a relation between the coordinates of a given portion on the arc of a rectangular hyperbola.

If O is the center, A the vertex, and P any point of the hyperbola APB,

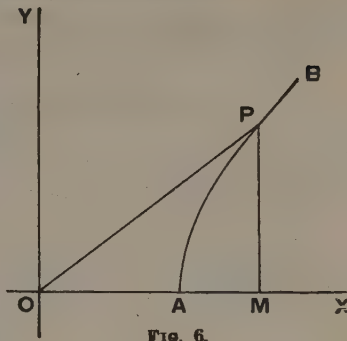
$$\begin{aligned} OM &= x, \\ MP &= y, \\ OA &= a. \end{aligned}$$

The function u may be defined by the following relation,

$$u = \frac{2 \times \text{Area OAP}}{OA^2}$$

The hyperbolic sine of $u = \sinh u = y/a$.

The hyperbolic cosine of $u = \cosh u = x/a$.



$$\sinh u = \frac{1}{2}(e^u - e^{-u}) = u + \frac{u^3}{3!} + \frac{u^5}{5!} + \dots$$

$$\cosh u = \frac{1}{2}(e^u + e^{-u}) = 1 + \frac{u^2}{2!} + \frac{u^4}{4!} + \dots$$

$$\tanh u = u - \frac{u^3}{3} + \frac{2u^5}{15} - \frac{17u^7}{315} + \dots \quad \left(u^2 < \frac{1}{4}\pi^2\right).$$

$$\sinh^{-1} u = u - \frac{1}{2} \cdot \frac{u^3}{3} + \frac{1 \cdot 3}{2 \cdot 4} \cdot \frac{u^5}{5} - \frac{1 \cdot 3 \cdot 5}{2 \cdot 4 \cdot 6} \cdot \frac{u^7}{7} + \dots \quad (u^2 < 1).$$

$$\sinh^{-1} u = \log 2u + \frac{1}{2} \cdot \frac{1}{2u^2} - \frac{1 \cdot 3}{2 \cdot 4} \cdot \frac{1}{4u^4} + \frac{1 \cdot 3 \cdot 5}{2 \cdot 4 \cdot 6} \cdot \frac{1}{6u^6} - \dots \quad (u^2 > 1).$$

$$\cosh^{-1} u = \log 2u - \frac{1}{2} \cdot \frac{1}{2u^2} - \frac{1 \cdot 3}{2 \cdot 4} \cdot \frac{1}{4u^4} - \frac{1 \cdot 3 \cdot 5}{2 \cdot 4 \cdot 6} \cdot \frac{1}{6u^6} - \dots \quad (u^2 > 1).$$

$$\tanh^{-1} u = u + \frac{u^3}{3} + \frac{u^5}{5} + \frac{u^7}{7} + \dots \quad (u^2 < 1).$$

$$\tanh u = \frac{\sinh u}{\cosh u} \quad \text{sech } u = \frac{1}{\cosh u}.$$

HYPERBOLIC FUNCTIONS (Continued)

$$\coth u = \frac{1}{\tanh u} \quad \operatorname{csch} u = \frac{1}{\sinh u}.$$

Relations of the Functions

$$\begin{aligned} \sinh x &= -\sinh(-x), & \operatorname{sech} x &= \operatorname{sech}(-x), \\ \cosh x &= \cosh(-x), & \operatorname{csch} x &= -\operatorname{csch}(-x), \\ \tanh x &= -\tanh(-x), & \coth x &= -\coth(-x). \end{aligned}$$

$$\sinh x = \frac{2 \tanh \frac{1}{2}x}{1 - \tanh^2 \frac{1}{2}x} = \frac{\tanh x}{\sqrt{1 - \tanh^2 x}}.$$

$$\cosh x = \frac{1 + \tanh^2 \frac{1}{2}x}{1 - \tanh^2 \frac{1}{2}x} = \frac{1}{\sqrt{1 - \tanh^2 x}}.$$

$$\cosh^2 x - \sinh^2 x = 1.$$

$$\begin{aligned} \tanh x &= \sqrt{1 - \operatorname{sech}^2 x}, & \operatorname{sech} x &= \sqrt{1 - \tanh^2 x}, \\ \coth x &= \sqrt{\operatorname{csch}^2 x + 1}, & \operatorname{csch} x &= \sqrt{\coth^2 x - 1}. \end{aligned}$$

$$\sinh \left(\frac{1}{2}x\right) = \sqrt{\frac{1}{2}(\cosh x - 1)}.$$

$$\cosh \left(\frac{1}{2}x\right) = \sqrt{\frac{1}{2}(\cosh x + 1)}.$$

$$\tanh \left(\frac{1}{2}x\right) = (\cosh x - 1) \div \sinh x = \sinh x \div (\cosh x + 1).$$

$$\sinh(2x) = 2 \sinh x \cosh x.$$

$$\cosh(2x) = \cosh^2 x + \sinh^2 x = 2 \cosh^2 x - 1 = 1 + 2 \sinh^2 x$$

$$\tanh(2x) = 2 \tanh x \div (1 + \tanh^2 x).$$

$$\sinh 3x = 3 \sinh x + 4 \sinh^3 x.$$

$$\cosh 3x = 4 \cosh^3 x - 3 \cosh x.$$

$$\tanh 3x = (3 \tanh x + \tanh^3 x) \div (1 + 3 \tanh^2 x).$$

$$\sinh(x \pm y) = \sinh x \cdot \cosh y \pm \cosh x \cdot \sinh y.$$

$$\cosh(x \pm y) = \cosh x \cdot \cosh y \pm \sinh x \cdot \sinh y.$$

$$\tanh(x \pm y) = (\tanh x \pm \tanh y) \div (1 \pm \tanh x \cdot \tanh y).$$

$$\sinh x + \sinh y = 2 \sinh \frac{1}{2}(x + y) \cdot \cosh \frac{1}{2}(x - y).$$

$$\sinh x - \sinh y = 2 \cosh \frac{1}{2}(x + y) \cdot \sinh \frac{1}{2}(x - y).$$

$$\cosh x + \cosh y = 2 \cosh \frac{1}{2}(x + y) \cdot \cosh \frac{1}{2}(x - y).$$

$$\cosh x - \cosh y = 2 \sinh \frac{1}{2}(x + y) \cdot \sinh \frac{1}{2}(x - y).$$

$$\sinh x + \cosh x = \frac{1 + \tanh \frac{1}{2}x}{1 - \tanh \frac{1}{2}x}$$

$$\tanh x \pm \tanh y = \frac{\sinh(x \pm y)}{\cosh x \cosh y}.$$

$$\coth x \pm \coth y = \pm \frac{\sinh(x \pm y)}{\sinh x \sinh y}.$$

Inverse Functions

$$\sinh^{-1} x = \log(x + \sqrt{x^2 + 1}) = \int \frac{dx}{\sqrt{x^2 + 1}} = \cosh^{-1} \sqrt{x^2 + 1}$$

HYPERBOLIC FUNCTIONS (Continued)

$$\cosh^{-1} x = \log (x + \sqrt{x^2 - 1}) = \int \frac{dx}{\sqrt{x^2 - 1}} = \sinh^{-1} \sqrt{x^2 - 1}.$$

$$\tanh^{-1} x = \frac{1}{2} \log (1 + x) - \frac{1}{2} \log (1 - x) = \int \frac{dx}{1 - x^2}.$$

$$\coth^{-1} x = \frac{1}{2} \log (1 + x) - \frac{1}{2} \log (x - 1) = \int \frac{dx}{1 - x^2}.$$

$$\operatorname{sech}^{-1} x = \log \left(\frac{1}{x} + \sqrt{\frac{1}{x^2} - 1} \right) = - \int \frac{dx}{x\sqrt{1 - x^2}}.$$

$$\operatorname{csch}^{-1} x = \log \left(\frac{1}{x} + \sqrt{\frac{1}{x^2} + 1} \right) = - \int \frac{dx}{x\sqrt{x^2 + 1}}.$$

Relations to Circular Functions

$$\begin{array}{ll} \sinh x = -i \sin ix. & \sinh ix = i \sin x. \\ \cosh x = \cos ix. & \cosh ix = \cos x. \\ \tanh x = -i \tan ix. & \tanh ix = i \tan x. \end{array}$$

$$\text{If } x = \log \tan \left(\frac{\pi}{4} + \frac{\theta}{2} \right) = \log (\sec \theta + \tan \theta),$$

$$\theta = \text{the gudermannian of } x = \operatorname{gd} x.$$

$$\begin{array}{ll} \sinh x = \tan \operatorname{gd} x. & \tanh x = \sin \operatorname{gd} x. \\ \cosh x = \sec \operatorname{gd} x. & \tanh \frac{1}{2} x = \tan \frac{1}{2} \operatorname{gd} x. \end{array}$$

$$\frac{d \operatorname{gd} x}{dx} = \operatorname{sech} x.$$

Differentials

$$\begin{array}{ll} d \sinh x = \cosh x \cdot dx. & d \coth x = -\operatorname{csch}^2 x \cdot dx. \\ d \cosh x = \sinh x \cdot dx. & d \operatorname{sech} x = -\operatorname{sech} x \cdot \tanh x \cdot dx. \\ d \tanh x = \operatorname{sech}^2 x \cdot dx. & d \operatorname{csch} x = -\operatorname{csch} x \cdot \coth x \cdot dx. \end{array}$$

$$d \sinh^{-1} x = \frac{dx}{\sqrt{1 + x^2}}. \quad d \coth^{-1} x = -\frac{dx}{x^2 - 1}.$$

$$d \cosh^{-1} x = \frac{dx}{\sqrt{x^2 - 1}}. \quad d \operatorname{sech}^{-1} x = -\frac{dx}{x\sqrt{1 - x^2}}.$$

$$d \tanh^{-1} x = \frac{dx}{1 - x^2}. \quad d \operatorname{csch}^{-1} x = -\frac{dx}{x\sqrt{x^2 + 1}}.$$

Integrals involving the hyperbolic functions will be found in the table of integrals.

ELLIPTIC FUNCTIONS

$$u = F(k, \phi) = \int_0^\phi \frac{d\phi}{\sqrt{1 - k^2 \sin^2 \phi}}, \quad (k^2 < 1),$$

= elliptic integral of the first kind.

$$u = \int_0^x \frac{dx}{\sqrt{(1 - x^2)(1 - k^2 x^2)}}, \quad \text{where } x = \sin \phi.$$

ϕ is called the amplitude of u or $\text{am } u$.
 k is called the modulus.

$$k' = \sqrt{1 - k^2} = \text{the complementary modulus.}$$

$$\sin \phi = \text{sn } u = x. \quad \tan \phi = \text{tn } u = \frac{x}{\sqrt{1 - x^2}}.$$

$$\begin{aligned} \cos \phi &= \text{cn } u = \sqrt{1 - x^2}. & \Delta \phi &= \text{dn } u = \sqrt{1 - k^2 x^2}. \\ \text{am } 0 &= 0. & \text{sn } 0 &= 0. \\ \text{cn } 0 &= 1. & \text{dn } 0 &= 1. \\ \text{am } (-u) &= -\text{am } u. & \text{sn } (-u) &= -\text{sn } u. \\ \text{cn } (-u) &= \text{cn } u. & \text{dn } (-u) &= \text{dn } u. \\ \text{tn } (-u) &= -\text{tn } u. \\ \text{sn}^2 u + \text{cn}^2 u &= 1. \\ \text{dn}^2 u + k^2 \text{sn}^2 u &= 1. \\ \text{dn}^2 u - k^2 \text{cn}^2 u &= 1 - k^2 = k'^2. \end{aligned}$$

$$\begin{aligned} E(\phi, k) &= \int_0^\phi \sqrt{1 - k^2 \sin^2 \phi} \, d\phi \\ &= \int_0^x \frac{x \sqrt{1 - k^2 x^2}}{\sqrt{1 - x^2}} \, dx & \text{where } x = \sin \phi \\ &= \text{the elliptic integral of the second kind.} \end{aligned}$$

Complete Elliptic Integrals

$$K = \int_0^{\pi/2} \frac{d\phi}{\sqrt{1 - k^2 \sin^2 \phi}}.$$

$$E = \int_0^{\pi/2} \sqrt{1 - k^2 \sin^2 \phi} \, d\phi.$$

See tables of values, page 205-207.

INTEREST TABLES

SIMPLE INTEREST

If P is the principal placed at interest at a rate i (expressed as a decimal), for a period of n years

The amount,

$$A = P(1 + ni)$$

Present value,

$$P = \frac{A}{1 + ni}$$

COMPOUND INTEREST

At interest compounded annually the **amount**,—

$$A = P(1 + i)^n$$

At interest compounded q times per year,—

$$A = P \left(1 + \frac{i}{q}\right)^{nq}$$

At interest compounded annually the **present value**,—

$$P = \frac{A}{(1 + i)^n} = A(1 + i)^{-n} = Av^n. \quad v = \frac{1}{1 + i}$$

At interest compounded q times per year,—

$$P = A \left(1 + \frac{i}{q}\right)^{-nq}$$

The amount of an annuity of 1 per annum,—

$$s_{\overline{n}|} \text{ at } i = \frac{(1 + i)^n - 1}{i}$$

The present value of an annuity,—

$$a_{\overline{n}|} \text{ at } i = \frac{1 - (1 + i)^{-n}}{i}$$

The annuity whose present value is 1,—

$$\frac{1}{a_{\overline{n}|} \text{ at } i} = \frac{1}{s_{\overline{n}|}} + i = \frac{i}{(1 - v^n)}$$

Compound amount of 1 for fractional periods,— $(1 + i)^{1/p}$

Nominal rate convertible p times per year equivalent to effective rate i ,—

$$j_p = p[(1 + i)^{1/p} - 1]$$

Amount for year of p deposits of $1/p$, p times per year,— i/j_p

INTEREST TABLES (Continued)

THE NUMBER OF EACH DAY OF THE YEAR

| Day of Mo. | Jan. | Feb. | Mar. | Apr. | May | Jun. | Jul. | Aug. | Sep. | Oct. | Nov. | Dec. | Day of Mo. |
|------------------|------|------|------|------|-----|------|------|------|------|------|------|------|------------------|
| 1 | 1 | 32 | 60 | 91 | 121 | 152 | 182 | 213 | 244 | 274 | 305 | 335 | 1 |
| 2 | 2 | 33 | 61 | 92 | 122 | 153 | 183 | 214 | 245 | 275 | 306 | 336 | 2 |
| 3 | 3 | 34 | 62 | 93 | 123 | 154 | 184 | 215 | 246 | 276 | 307 | 337 | 3 |
| 4 | 4 | 35 | 63 | 94 | 124 | 155 | 185 | 216 | 247 | 277 | 308 | 338 | 4 |
| 5 | 5 | 36 | 64 | 95 | 125 | 156 | 186 | 217 | 248 | 278 | 309 | 339 | 5 |
| 6 | 6 | 37 | 65 | 96 | 126 | 157 | 187 | 218 | 249 | 279 | 310 | 340 | 6 |
| 7 | 7 | 38 | 66 | 97 | 127 | 158 | 188 | 219 | 250 | 280 | 311 | 341 | 7 |
| 8 | 8 | 39 | 67 | 98 | 128 | 159 | 189 | 220 | 251 | 281 | 312 | 342 | 8 |
| 9 | 9 | 40 | 68 | 99 | 129 | 160 | 190 | 221 | 252 | 282 | 313 | 343 | 9 |
| 10 | 10 | 41 | 69 | 100 | 130 | 161 | 191 | 222 | 253 | 283 | 314 | 344 | 10 |
| 11 | 11 | 42 | 70 | 101 | 131 | 162 | 192 | 223 | 254 | 284 | 315 | 345 | 11 |
| 12 | 12 | 43 | 71 | 102 | 132 | 163 | 193 | 224 | 255 | 285 | 316 | 346 | 12 |
| 13 | 13 | 44 | 72 | 103 | 133 | 164 | 194 | 225 | 256 | 286 | 317 | 347 | 13 |
| 14 | 14 | 45 | 73 | 104 | 134 | 165 | 195 | 226 | 257 | 287 | 318 | 348 | 14 |
| 15 | 15 | 46 | 74 | 105 | 135 | 166 | 196 | 227 | 258 | 288 | 319 | 349 | 15 |
| 16 | 16 | 47 | 75 | 106 | 136 | 167 | 197 | 228 | 259 | 289 | 320 | 350 | 16 |
| 17 | 17 | 48 | 76 | 107 | 137 | 168 | 198 | 229 | 260 | 290 | 321 | 351 | 17 |
| 18 | 18 | 49 | 77 | 108 | 138 | 169 | 199 | 230 | 261 | 291 | 322 | 352 | 18 |
| 19 | 19 | 50 | 78 | 109 | 139 | 170 | 200 | 231 | 262 | 292 | 323 | 353 | 19 |
| 20 | 20 | 51 | 79 | 110 | 140 | 171 | 201 | 232 | 263 | 293 | 324 | 354 | 20 |
| 21 | 21 | 52 | 80 | 111 | 141 | 172 | 202 | 233 | 264 | 294 | 325 | 355 | 21 |
| 22 | 22 | 53 | 81 | 112 | 142 | 173 | 203 | 234 | 265 | 295 | 326 | 356 | 22 |
| 23 | 23 | 54 | 82 | 113 | 143 | 174 | 204 | 235 | 266 | 296 | 327 | 357 | 23 |
| 24 | 24 | 55 | 83 | 114 | 144 | 175 | 205 | 236 | 267 | 297 | 328 | 358 | 24 |
| 25 | 25 | 56 | 84 | 115 | 145 | 176 | 206 | 237 | 268 | 298 | 329 | 359 | 25 |
| 26 | 26 | 57 | 85 | 116 | 146 | 177 | 207 | 238 | 269 | 299 | 330 | 360 | 26 |
| 27 | 27 | 58 | 86 | 117 | 147 | 178 | 208 | 239 | 270 | 300 | 331 | 361 | 27 |
| 28 | 28 | 59 | 87 | 118 | 148 | 179 | 209 | 240 | 271 | 301 | 332 | 362 | 28 |
| 29 | 29 | * | 88 | 119 | 149 | 180 | 210 | 241 | 272 | 302 | 333 | 363 | 29 |
| 30 | 30 | | 89 | 120 | 150 | 181 | 211 | 242 | 273 | 303 | 334 | 364 | 30 |
| 31 | 31 | | 90 | | 151 | | 212 | 243 | | 304 | | 365 | 31 |

* In leap years, after February 28, add 1 to the tabulated number.

INTEREST TABLES (Continued)

AMOUNT AT COMPOUND INTEREST $(1 + i)^n$

The following table gives the amount after a term of n years on unit original principal at rate of interest i .

| Years n | Rate i | | | | |
|--------------|---------------------------|-----------------------------|--------------------------|------------------------------|---------------------------|
| | .0025 ($\frac{1}{4}\%$) | .004167 ($\frac{1}{2}\%$) | .005 ($\frac{1}{2}\%$) | .005833 ($\frac{7}{12}\%$) | .0075 ($\frac{3}{4}\%$) |
| 1 | 1.00250000 | 1.00416667 | 1.00500000 | 1.00583333 | 1.00750000 |
| 2 | 1.00500625 | 1.00835069 | 1.01002500 | 1.01170069 | 1.01505625 |
| 3 | 1.00751877 | 1.01255216 | 1.01507513 | 1.01760228 | 1.02266917 |
| 4 | 1.01003756 | 1.01677112 | 1.02015050 | 1.02353330 | 1.03033919 |
| 5 | 1.01256266 | 1.02100767 | 1.02525125 | 1.02950894 | 1.03806673 |
| 6 | 1.01509406 | 1.02526187 | 1.03037751 | 1.03551440 | 1.04585224 |
| 7 | 1.01763180 | 1.02953379 | 1.03552940 | 1.04155490 | 1.05369613 |
| 8 | 1.02017588 | 1.03382352 | 1.04070704 | 1.04763064 | 1.06159885 |
| 9 | 1.02272632 | 1.03813111 | 1.04591058 | 1.05374182 | 1.06956084 |
| 10 | 1.02528313 | 1.04245666 | 1.05114013 | 1.05988865 | 1.07758255 |
| 11 | 1.02784634 | 1.04680023 | 1.05639583 | 1.06607133 | 1.08566441 |
| 12 | 1.03041596 | 1.05116190 | 1.06167781 | 1.07229008 | 1.09380690 |
| 13 | 1.03299200 | 1.05554174 | 1.06698620 | 1.07854511 | 1.10201045 |
| 14 | 1.03557448 | 1.05993983 | 1.07232113 | 1.08483662 | 1.11027553 |
| 15 | 1.03816341 | 1.06435625 | 1.07768274 | 1.09116483 | 1.11860259 |
| 16 | 1.04075882 | 1.06879106 | 1.08307115 | 1.09752996 | 1.12699211 |
| 17 | 1.04336072 | 1.07324436 | 1.08848651 | 1.10393222 | 1.13544455 |
| 18 | 1.04596912 | 1.07771621 | 1.09392894 | 1.11037182 | 1.14396039 |
| 19 | 1.04858404 | 1.08220670 | 1.09939858 | 1.11684899 | 1.15254009 |
| 20 | 1.05120550 | 1.08671589 | 1.10489558 | 1.12336395 | 1.16118414 |
| 21 | 1.05383352 | 1.09124387 | 1.11042006 | 1.12991690 | 1.16989302 |
| 22 | 1.05646810 | 1.09579072 | 1.11597216 | 1.13650808 | 1.17866722 |
| 23 | 1.05910927 | 1.10035652 | 1.12155202 | 1.14313771 | 1.18750723 |
| 24 | 1.06175704 | 1.10494134 | 1.12715978 | 1.14980602 | 1.19641353 |
| 25 | 1.06441144 | 1.10954526 | 1.13279558 | 1.15651322 | 1.20538663 |
| 26 | 1.06707247 | 1.11416836 | 1.13845955 | 1.16325955 | 1.21442703 |
| 27 | 1.06974015 | 1.11881073 | 1.14415185 | 1.17004523 | 1.22353523 |
| 28 | 1.07241450 | 1.12347244 | 1.14987261 | 1.17687049 | 1.23271175 |
| 29 | 1.07509553 | 1.12815358 | 1.15562197 | 1.18373557 | 1.24195709 |
| 30 | 1.07778327 | 1.13285422 | 1.16140008 | 1.19064069 | 1.25127176 |
| 31 | 1.08047773 | 1.13757444 | 1.16720708 | 1.19758610 | 1.26065630 |
| 32 | 1.08317892 | 1.14231434 | 1.17304312 | 1.20457202 | 1.27011122 |
| 33 | 1.08588687 | 1.14707398 | 1.17890833 | 1.21159869 | 1.27963706 |
| 34 | 1.08860159 | 1.15185346 | 1.18480288 | 1.21866634 | 1.28923434 |
| 35 | 1.09132309 | 1.15665284 | 1.19072689 | 1.22577523 | 1.29890359 |
| 36 | 1.09405140 | 1.16147223 | 1.19668052 | 1.23292559 | 1.30864537 |
| 37 | 1.09678653 | 1.16631170 | 1.20266393 | 1.24011765 | 1.31846021 |
| 38 | 1.09952850 | 1.17117133 | 1.20867725 | 1.24735167 | 1.32834866 |
| 39 | 1.10227732 | 1.17605121 | 1.21472063 | 1.25462789 | 1.33831128 |
| 40 | 1.10503301 | 1.18095142 | 1.22079424 | 1.26194655 | 1.34834861 |
| 41 | 1.10779559 | 1.18587206 | 1.22689821 | 1.26930791 | 1.35846123 |
| 42 | 1.11056508 | 1.19081319 | 1.23303270 | 1.27671220 | 1.36864969 |
| 43 | 1.11334149 | 1.19577491 | 1.23919786 | 1.28415969 | 1.37891456 |
| 44 | 1.11612485 | 1.20075731 | 1.24539385 | 1.29165062 | 1.38925642 |
| 45 | 1.11891516 | 1.20576046 | 1.25162082 | 1.29918525 | 1.39967584 |
| 46 | 1.12171245 | 1.21078446 | 1.25787892 | 1.30676383 | 1.41017341 |
| 47 | 1.12451673 | 1.21582940 | 1.26416832 | 1.31438862 | 1.42074971 |
| 48 | 1.12732802 | 1.22089536 | 1.27048916 | 1.32205388 | 1.43140533 |
| 49 | 1.13014634 | 1.22598242 | 1.27684161 | 1.32976586 | 1.44214087 |
| 50 | 1.13297171 | 1.23109068 | 1.28322581 | 1.33752283 | 1.45295693 |

INTEREST TABLES (Continued)

AMOUNT AT COMPOUND INTEREST $(1 + i)^n$

(Continued)

| Years | Rate i | | | | |
|-------|--------------------------|----------------------------|-------------------------|----------------------------|--------------------------|
| n | .0025($\frac{1}{4}\%$) | .004167($\frac{1}{2}\%$) | .005($\frac{1}{2}\%$) | .005833($\frac{1}{2}\%$) | .0075($\frac{3}{4}\%$) |
| 50 | 1.13297171 | 1.23109068 | 1.28322581 | 1.33752283 | 1.45295693 |
| 51 | 1.13580414 | 1.23622022 | 1.28964194 | 1.34532504 | 1.46385411 |
| 52 | 1.13864365 | 1.24137114 | 1.29609015 | 1.35317277 | 1.47483301 |
| 53 | 1.14149026 | 1.24654352 | 1.30257060 | 1.36106628 | 1.48589426 |
| 54 | 1.14434398 | 1.25173745 | 1.30908346 | 1.36900583 | 1.49703847 |
| 55 | 1.14720484 | 1.25695302 | 1.31562887 | 1.37699170 | 1.50826626 |
| 56 | 1.15007285 | 1.26219033 | 1.32220702 | 1.38502415 | 1.51957825 |
| 57 | 1.15294804 | 1.26744946 | 1.32881805 | 1.39310346 | 1.53097509 |
| 58 | 1.15583041 | 1.27273050 | 1.33546214 | 1.40122990 | 1.54245740 |
| 59 | 1.15871998 | 1.27803354 | 1.34213946 | 1.40940374 | 1.55402583 |
| 60 | 1.16161678 | 1.28335868 | 1.34885015 | 1.41762526 | 1.56568103 |
| 61 | 1.16452082 | 1.28870601 | 1.35559440 | 1.42589474 | 1.57742363 |
| 62 | 1.16743213 | 1.29407561 | 1.36237238 | 1.43421246 | 1.58925431 |
| 63 | 1.17035071 | 1.29946760 | 1.36918424 | 1.44257870 | 1.60117372 |
| 64 | 1.17327658 | 1.30488204 | 1.37603016 | 1.45099374 | 1.61318252 |
| 65 | 1.17620977 | 1.31031905 | 1.38291031 | 1.45945787 | 1.62528139 |
| 66 | 1.17915030 | 1.31577872 | 1.38982486 | 1.46797138 | 1.63747100 |
| 67 | 1.18209817 | 1.32126113 | 1.39677399 | 1.47653454 | 1.64975203 |
| 68 | 1.18505342 | 1.32676638 | 1.40375785 | 1.48514766 | 1.66212517 |
| 69 | 1.18801605 | 1.33229458 | 1.41077664 | 1.49381102 | 1.67459111 |
| 70 | 1.19098609 | 1.33784580 | 1.41783053 | 1.50252492 | 1.68715055 |
| 71 | 1.19396356 | 1.34342016 | 1.42491968 | 1.51128965 | 1.69980418 |
| 72 | 1.19694847 | 1.34901774 | 1.43204428 | 1.52010550 | 1.71255271 |
| 73 | 1.19994084 | 1.35463865 | 1.43920450 | 1.52897279 | 1.72539685 |
| 74 | 1.20294069 | 1.36028298 | 1.44640052 | 1.53789179 | 1.73833733 |
| 75 | 1.20594804 | 1.36595082 | 1.45363252 | 1.54686283 | 1.75137486 |
| 76 | 1.20896291 | 1.37164229 | 1.46090069 | 1.55588620 | 1.76451017 |
| 77 | 1.21198532 | 1.37735746 | 1.46820519 | 1.56496220 | 1.77774400 |
| 78 | 1.21501528 | 1.38309645 | 1.47554622 | 1.57409115 | 1.79107708 |
| 79 | 1.21805282 | 1.38885935 | 1.48292395 | 1.58327334 | 1.80451015 |
| 80 | 1.22109795 | 1.39464627 | 1.49033857 | 1.59250910 | 1.81804398 |
| 81 | 1.22415070 | 1.40045729 | 1.49779026 | 1.60179874 | 1.83167931 |
| 82 | 1.22721103 | 1.40629253 | 1.50527921 | 1.61114257 | 1.84541691 |
| 83 | 1.23027910 | 1.41215209 | 1.51280561 | 1.62054090 | 1.85925753 |
| 84 | 1.23335480 | 1.41803605 | 1.52036964 | 1.62999405 | 1.87320196 |
| 85 | 1.23643819 | 1.42394454 | 1.52797148 | 1.63950235 | 1.88725098 |
| 86 | 1.23952928 | 1.42987764 | 1.53561134 | 1.64906612 | 1.90140536 |
| 87 | 1.24262811 | 1.43583546 | 1.54328940 | 1.65868567 | 1.91566590 |
| 88 | 1.24573468 | 1.44181811 | 1.55100585 | 1.66836134 | 1.93003339 |
| 89 | 1.24884901 | 1.44782568 | 1.55876087 | 1.67809344 | 1.94450865 |
| 90 | 1.25197114 | 1.45385829 | 1.56655468 | 1.68788232 | 1.95909246 |
| 91 | 1.25510106 | 1.45991603 | 1.57438745 | 1.69772830 | 1.97378565 |
| 92 | 1.25823382 | 1.46599902 | 1.58225939 | 1.70763172 | 1.98858905 |
| 93 | 1.26138441 | 1.47210735 | 1.59017069 | 1.71759290 | 2.00350346 |
| 94 | 1.26453787 | 1.47824113 | 1.59812154 | 1.72761219 | 2.01852974 |
| 95 | 1.26769922 | 1.48440047 | 1.60611215 | 1.73768993 | 2.03366871 |
| 96 | 1.27086847 | 1.49058547 | 1.61414271 | 1.74782646 | 2.04892123 |
| 97 | 1.27404564 | 1.49679624 | 1.62221342 | 1.75802211 | 2.06428814 |
| 98 | 1.27723075 | 1.50303289 | 1.63032449 | 1.76827724 | 2.07977030 |
| 99 | 1.28042383 | 1.50929553 | 1.63847611 | 1.77859219 | 2.09536858 |
| 100 | 1.28362489 | 1.51558426 | 1.64666849 | 1.78896731 | 2.11108384 |

INTEREST TABLES (Continued)

AMOUNT AT COMPOUND INTEREST $(1 + i)^n$

(Continued)

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|---------------|---------------------------|--------------------------|-------------------------|--------------------------|
| | .01(1 %) | .01125($1\frac{1}{8}$ %) | .0125($1\frac{1}{4}$ %) | .015($1\frac{1}{2}$ %) | .0175($1\frac{3}{4}$ %) |
| 1 | 1.01000000 | 1.01125000 | 1.01250000 | 1.01500000 | 1.01750000 |
| 2 | 1.02010000 | 1.02262656 | 1.02515625 | 1.03022500 | 1.03530625 |
| 3 | 1.03030100 | 1.03413111 | 1.03797070 | 1.04567838 | 1.05342411 |
| 4 | 1.04060401 | 1.04576509 | 1.05094534 | 1.06136355 | 1.07185903 |
| 5 | 1.05101005 | 1.05752994 | 1.06408215 | 1.07728400 | 1.09061656 |
| 6 | 1.06152015 | 1.06942716 | 1.07738318 | 1.09344326 | 1.10970235 |
| 7 | 1.07213535 | 1.08145821 | 1.09085047 | 1.10984491 | 1.12912215 |
| 8 | 1.08285671 | 1.09362462 | 1.10448610 | 1.12649259 | 1.14888178 |
| 9 | 1.09368527 | 1.10592789 | 1.11829218 | 1.14338998 | 1.16898721 |
| 10 | 1.10462213 | 1.11836958 | 1.13227083 | 1.16054083 | 1.18944449 |
| 11 | 1.11566835 | 1.13095124 | 1.14642422 | 1.17794894 | 1.21025977 |
| 12 | 1.12682503 | 1.14367444 | 1.16075452 | 1.19561817 | 1.23143931 |
| 13 | 1.13809328 | 1.15654078 | 1.17526395 | 1.21355244 | 1.25298950 |
| 14 | 1.14947421 | 1.16955186 | 1.18995475 | 1.23175573 | 1.27491682 |
| 15 | 1.16096896 | 1.18270932 | 1.20482918 | 1.25023207 | 1.29722786 |
| 16 | 1.17257864 | 1.19601480 | 1.21988955 | 1.26898555 | 1.31992935 |
| 17 | 1.18430443 | 1.20946997 | 1.23513817 | 1.28802033 | 1.34302811 |
| 18 | 1.19614748 | 1.22307650 | 1.25057739 | 1.30734064 | 1.36653111 |
| 19 | 1.20810895 | 1.23683611 | 1.26620961 | 1.32695075 | 1.39044540 |
| 20 | 1.22019004 | 1.25075052 | 1.28203723 | 1.34685501 | 1.41477820 |
| 21 | 1.23239194 | 1.26482146 | 1.29806270 | 1.36705783 | 1.43953681 |
| 22 | 1.24471586 | 1.27905071 | 1.31428848 | 1.38756370 | 1.46472871 |
| 23 | 1.25716302 | 1.29344003 | 1.33071709 | 1.40837715 | 1.49036146 |
| 24 | 1.26973465 | 1.30799123 | 1.34735105 | 1.42950281 | 1.51644279 |
| 25 | 1.28243200 | 1.32270613 | 1.36419294 | 1.45094535 | 1.54298054 |
| 26 | 1.29525631 | 1.33758657 | 1.38124535 | 1.47270953 | 1.56998269 |
| 27 | 1.30820888 | 1.35263442 | 1.39851092 | 1.49480018 | 1.59745739 |
| 28 | 1.32129097 | 1.36785156 | 1.41599230 | 1.51722218 | 1.62541290 |
| 29 | 1.33450388 | 1.38323989 | 1.43369221 | 1.53998051 | 1.65385762 |
| 30 | 1.34784892 | 1.39880134 | 1.45161336 | 1.56308022 | 1.68280013 |
| 31 | 1.36132740 | 1.41453785 | 1.46975853 | 1.58652642 | 1.71224913 |
| 32 | 1.37494068 | 1.43045140 | 1.48813051 | 1.61032432 | 1.74221349 |
| 33 | 1.38869009 | 1.44654398 | 1.50673214 | 1.63447918 | 1.77270223 |
| 34 | 1.40257699 | 1.46281760 | 1.52556629 | 1.65899637 | 1.80372452 |
| 35 | 1.41660276 | 1.47927430 | 1.54463587 | 1.68388132 | 1.83528970 |
| 36 | 1.43076878 | 1.49591613 | 1.56394382 | 1.70913954 | 1.86740727 |
| 37 | 1.44507647 | 1.51274519 | 1.58349312 | 1.73477663 | 1.90008689 |
| 38 | 1.45952724 | 1.52976357 | 1.60328678 | 1.76079828 | 1.93333841 |
| 39 | 1.47412251 | 1.54697341 | 1.62332787 | 1.78721025 | 1.96717184 |
| 40 | 1.48886373 | 1.56437687 | 1.64361946 | 1.81401841 | 2.00159734 |
| 41 | 1.50375237 | 1.58197611 | 1.66416471 | 1.84122868 | 2.03662530 |
| 42 | 1.51878989 | 1.59977334 | 1.68496677 | 1.86884712 | 2.07226624 |
| 43 | 1.53397779 | 1.61777079 | 1.70602885 | 1.89687982 | 2.10853090 |
| 44 | 1.54931757 | 1.63597071 | 1.72735421 | 1.92533302 | 2.14543019 |
| 45 | 1.56481075 | 1.65437538 | 1.74894614 | 1.95421301 | 2.18297522 |
| 46 | 1.58045885 | 1.67298710 | 1.77080797 | 1.98352621 | 2.22117728 |
| 47 | 1.59626344 | 1.69180821 | 1.79294306 | 2.01327910 | 2.26004789 |
| 48 | 1.61222608 | 1.71084105 | 1.81535485 | 2.04347829 | 2.29959872 |
| 49 | 1.62834834 | 1.73008801 | 1.83804679 | 2.07413046 | 2.33984170 |
| 50 | 1.64463182 | 1.74955150 | 1.86102237 | 2.10524242 | 2.38078893 |

INTEREST TABLES (Continued)

AMOUNT AT COMPOUND INTEREST $(1 + i)^n$ (Continued)

| Year <i>n</i> | Rate <i>i</i> | | | | |
|------------------|---------------|---------------|--------------|-------------|--------------|
| | .01 (1 %) | .01125 (1½ %) | .0125 (1¼ %) | .015 (1½ %) | .0175 (1¾ %) |
| 50 | 1.64463182 | 1.74955150 | 1.86102237 | 2.10524242 | 2.38078893 |
| 51 | 1.66107814 | 1.76923395 | 1.88428515 | 2.13682106 | 2.42245274 |
| 52 | 1.67768892 | 1.78913784 | 1.90783872 | 2.16887337 | 2.46484566 |
| 53 | 1.69446581 | 1.80926564 | 1.93168670 | 2.20140647 | 2.50798046 |
| 54 | 1.71141047 | 1.82961988 | 1.95583279 | 2.23442757 | 2.55187012 |
| 55 | 1.72852457 | 1.85020310 | 1.98028070 | 2.26794398 | 2.59652785 |
| 56 | 1.74580982 | 1.87101788 | 2.00503420 | 2.30196314 | 2.64196708 |
| 57 | 1.76326792 | 1.89206684 | 2.03009713 | 2.33649259 | 2.68820151 |
| 58 | 1.78090060 | 1.91335259 | 2.05547335 | 2.37153998 | 2.73524503 |
| 59 | 1.79870960 | 1.93487780 | 2.08116676 | 2.40711308 | 2.78311182 |
| 60 | 1.81669670 | 1.95664518 | 2.10718135 | 2.44321978 | 2.83181628 |
| 61 | 1.83486367 | 1.97865744 | 2.13352111 | 2.47986807 | 2.88137306 |
| 62 | 1.85321230 | 2.00091733 | 2.16019013 | 2.51706609 | 2.93179709 |
| 63 | 1.87174443 | 2.02342765 | 2.18719250 | 2.55482208 | 2.98310354 |
| 64 | 1.89046187 | 2.04619121 | 2.21453241 | 2.59314442 | 3.03530785 |
| 65 | 1.90936649 | 2.06921087 | 2.24221407 | 2.63204158 | 3.08842574 |
| 66 | 1.92846015 | 2.09248949 | 2.27024174 | 2.67152221 | 3.14247319 |
| 67 | 1.94774475 | 2.11602999 | 2.29861976 | 2.71159504 | 3.19746647 |
| 68 | 1.96722220 | 2.13983533 | 2.32735251 | 2.75226896 | 3.25342213 |
| 69 | 1.98689442 | 2.16390848 | 2.35644442 | 2.79355300 | 3.31035702 |
| 70 | 2.00676337 | 2.18825245 | 2.38589997 | 2.83545629 | 3.36828827 |
| 71 | 2.02683100 | 2.21287029 | 2.41572372 | 2.87798814 | 3.42723331 |
| 72 | 2.04709931 | 2.23776508 | 2.44592027 | 2.92115796 | 3.48720990 |
| 73 | 2.06757031 | 2.26293994 | 2.47649427 | 2.96497533 | 3.54823607 |
| 74 | 2.08824601 | 2.28839801 | 2.50745045 | 3.00944996 | 3.61033020 |
| 75 | 2.10912847 | 2.31414249 | 2.53879358 | 3.05459171 | 3.67351098 |
| 76 | 2.13021975 | 2.34017659 | 2.57052850 | 3.10041059 | 3.73779742 |
| 77 | 2.15152195 | 2.36650358 | 2.60266011 | 3.14691674 | 3.80320888 |
| 78 | 2.17303717 | 2.39312675 | 2.63519336 | 3.19412050 | 3.86976503 |
| 79 | 2.19476754 | 2.42004942 | 2.66813327 | 3.24203230 | 3.93748592 |
| 80 | 2.21671522 | 2.44727498 | 2.70148494 | 3.29066279 | 4.00639192 |
| 81 | 2.23888237 | 2.47480682 | 2.73525350 | 3.34002273 | 4.07650378 |
| 82 | 2.26127119 | 2.50264840 | 2.76944417 | 3.39012307 | 4.14784260 |
| 83 | 2.28388390 | 2.53080319 | 2.80406222 | 3.44097492 | 4.22042984 |
| 84 | 2.30672274 | 2.55927473 | 2.83911300 | 3.49258954 | 4.29428737 |
| 85 | 2.32978997 | 2.58806657 | 2.87460191 | 3.54497838 | 4.36943740 |
| 86 | 2.35308787 | 2.61718232 | 2.91053444 | 3.59815306 | 4.44590255 |
| 87 | 2.37661875 | 2.64662562 | 2.94691612 | 3.65212535 | 4.52370584 |
| 88 | 2.40038494 | 2.67640016 | 2.98375257 | 3.70690723 | 4.60287070 |
| 89 | 2.42438879 | 2.70650966 | 3.02104948 | 3.76251084 | 4.68342093 |
| 90 | 2.44863267 | 2.73695789 | 3.05881260 | 3.81894851 | 4.76538080 |
| 91 | 2.47311900 | 2.76774867 | 3.09704775 | 3.87623273 | 4.84877496 |
| 92 | 2.49785019 | 2.79888584 | 3.13576085 | 3.93437622 | 4.93362853 |
| 93 | 2.52282869 | 2.83037331 | 3.17495786 | 3.99339187 | 5.01996703 |
| 94 | 2.54805698 | 2.86221501 | 3.21464483 | 4.05329275 | 5.10781645 |
| 95 | 2.57353755 | 2.89441492 | 3.25482789 | 4.11409214 | 5.19720324 |
| 96 | 2.59927293 | 2.92697709 | 3.29551324 | 4.17580352 | 5.28815429 |
| 97 | 2.62526565 | 2.95990559 | 3.33670716 | 4.23844057 | 5.38069699 |
| 98 | 2.65151831 | 2.99320452 | 3.37841600 | 4.30201718 | 5.47485919 |
| 99 | 2.67803349 | 3.02687807 | 3.42064620 | 4.36654744 | 5.57066923 |
| 100 | 2.70481383 | 3.06093045 | 3.46340427 | 4.43204565 | 5.66815594 |

INTEREST TABLES (Continued)

AMOUNT AT COMPOUND INTEREST $(1 + i)^n$ (Continued)

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|---------------|-------------|------------|-------------|------------|
| | .02(2 %) | .0225(2½ %) | .025(2½ %) | .0275(2¾ %) | .03(3 %) |
| 1 | 1.02000000 | 1.02250000 | 1.02500000 | 1.02750000 | 1.03000000 |
| 2 | 1.04040000 | 1.04550625 | 1.05062500 | 1.05575625 | 1.06090000 |
| 3 | 1.06120800 | 1.06903014 | 1.07689063 | 1.08478955 | 1.09272700 |
| 4 | 1.08243216 | 1.09308332 | 1.10381289 | 1.11462126 | 1.12550881 |
| 5 | 1.10408080 | 1.11767769 | 1.13140821 | 1.14527334 | 1.15927407 |
| 6 | 1.12616242 | 1.14282544 | 1.15969342 | 1.17676836 | 1.19405230 |
| 7 | 1.14868567 | 1.16853901 | 1.18868575 | 1.20912949 | 1.22987387 |
| 8 | 1.17165938 | 1.19483114 | 1.21840290 | 1.24238055 | 1.26677008 |
| 9 | 1.19509257 | 1.22171484 | 1.24886297 | 1.27654602 | 1.30477318 |
| 10 | 1.21899442 | 1.24920343 | 1.28008454 | 1.31165103 | 1.34391638 |
| 11 | 1.24337431 | 1.27731050 | 1.31208666 | 1.34772144 | 1.38423387 |
| 12 | 1.26824179 | 1.30604999 | 1.34488882 | 1.38478378 | 1.42576089 |
| 13 | 1.29360663 | 1.33543611 | 1.37851104 | 1.42286533 | 1.46853371 |
| 14 | 1.31947876 | 1.36548343 | 1.41297382 | 1.46199413 | 1.51258972 |
| 15 | 1.34586834 | 1.39620680 | 1.44829817 | 1.50219896 | 1.55796742 |
| 16 | 1.37278571 | 1.42762146 | 1.48450562 | 1.54350944 | 1.60470644 |
| 17 | 1.40024142 | 1.45974294 | 1.52161826 | 1.58595595 | 1.65284763 |
| 18 | 1.42824625 | 1.49258716 | 1.55965872 | 1.62956973 | 1.70243306 |
| 19 | 1.45681117 | 1.52617037 | 1.59865019 | 1.67438290 | 1.75350605 |
| 20 | 1.48594740 | 1.56050920 | 1.63861644 | 1.72042843 | 1.80611123 |
| 21 | 1.51566634 | 1.59562066 | 1.67958185 | 1.76774021 | 1.86029457 |
| 22 | 1.54597967 | 1.63152212 | 1.72157140 | 1.81635307 | 1.91610341 |
| 23 | 1.57689926 | 1.66823137 | 1.76461068 | 1.86630278 | 1.97358651 |
| 24 | 1.60843725 | 1.70576658 | 1.80872595 | 1.91762610 | 2.03279411 |
| 25 | 1.64060599 | 1.74414632 | 1.85394410 | 1.97036082 | 2.09377793 |
| 26 | 1.67341811 | 1.78338962 | 1.90029270 | 2.02454575 | 2.15659127 |
| 27 | 1.70688648 | 1.82351588 | 1.94780002 | 2.08022075 | 2.22128901 |
| 28 | 1.74102421 | 1.86454499 | 1.99649502 | 2.13742682 | 2.28792768 |
| 29 | 1.77584469 | 1.90649725 | 2.04640739 | 2.19620606 | 2.35656551 |
| 30 | 1.81136158 | 1.94939344 | 2.09756758 | 2.25660173 | 2.42726247 |
| 31 | 1.84758882 | 1.99325479 | 2.15000677 | 2.31865828 | 2.50008035 |
| 32 | 1.88454059 | 2.03810303 | 2.20375694 | 2.38242138 | 2.57508276 |
| 33 | 1.92223140 | 2.08396034 | 2.25885086 | 2.44793797 | 2.65233524 |
| 34 | 1.96067603 | 2.13084945 | 2.31532213 | 2.51525626 | 2.73190530 |
| 35 | 1.99988955 | 2.17879356 | 2.37320519 | 2.58442581 | 2.81386245 |
| 36 | 2.03988734 | 2.22781642 | 2.43253532 | 2.65549752 | 2.89827833 |
| 37 | 2.08068509 | 2.27794229 | 2.49334870 | 2.72852370 | 2.98522668 |
| 38 | 2.12229879 | 2.32919599 | 2.55568242 | 2.80355810 | 3.07478348 |
| 39 | 2.16474477 | 2.38160290 | 2.61957448 | 2.88065595 | 3.16702698 |
| 40 | 2.20803966 | 2.43518897 | 2.68506384 | 2.95987399 | 3.26203779 |
| 41 | 2.25220046 | 2.48998072 | 2.75219043 | 3.04127052 | 3.35989893 |
| 42 | 2.29724447 | 2.54600528 | 2.82099520 | 3.12490546 | 3.46069589 |
| 43 | 2.34318936 | 2.60329040 | 2.89152008 | 3.21084036 | 3.56451677 |
| 44 | 2.39005314 | 2.66186444 | 2.96380808 | 3.29913847 | 3.67145227 |
| 45 | 2.43785421 | 2.72175639 | 3.03790328 | 3.38986478 | 3.78159584 |
| 46 | 2.48661129 | 2.78299590 | 3.11385086 | 3.48308606 | 3.89504372 |
| 47 | 2.53634352 | 2.84561331 | 3.19169713 | 3.57887093 | 4.01189503 |
| 48 | 2.58707039 | 2.90963961 | 3.27148956 | 3.67728988 | 4.13225188 |
| 49 | 2.63881179 | 2.97510650 | 3.35327680 | 3.77841535 | 4.25621944 |
| 50 | 2.69158803 | 3.04204640 | 3.43710872 | 3.88232177 | 4.38390602 |

INTEREST TABLES (Continued)

AMOUNT AT COMPOUND INTEREST $(1 + i)^n$ (Continued)

| Years | Rate i | | | | |
|-------|------------|--------------|-------------|--------------|------------|
| n | .02 (2 %) | .0225 (2½ %) | .025 (2½ %) | .0275 (2¾ %) | .03 (3 %) |
| 50 | 2.69158803 | 3.04204640 | 3.43710872 | 3.88232177 | 4.38390602 |
| 51 | 2.74541979 | 3.11049244 | 3.52303644 | 3.98908562 | 4.51542320 |
| 52 | 2.80032819 | 3.18047852 | 3.61111235 | 4.09878547 | 4.65088590 |
| 53 | 2.85633475 | 3.25203929 | 3.70139016 | 4.21150208 | 4.79041247 |
| 54 | 2.91346144 | 3.32521017 | 3.79392491 | 4.32731838 | 4.93412485 |
| 55 | 2.97173067 | 3.40002740 | 3.88877303 | 4.44631964 | 5.08214859 |
| 56 | 3.03116529 | 3.47652802 | 3.98599236 | 4.56859343 | 5.23461305 |
| 57 | 3.09178859 | 3.55474990 | 4.08564217 | 4.69422975 | 5.39165144 |
| 58 | 3.15362436 | 3.63473177 | 4.18778322 | 4.82332107 | 5.55340098 |
| 59 | 3.21669685 | 3.71651324 | 4.29247780 | 4.95596239 | 5.72000301 |
| 60 | 3.28103079 | 3.80013479 | 4.39978975 | 5.09225136 | 5.89160310 |
| 61 | 3.34665140 | 3.88563782 | 4.50978449 | 5.23228827 | 6.06835120 |
| 62 | 3.41358443 | 3.97306467 | 4.62252910 | 5.37617620 | 6.25040173 |
| 63 | 3.48185612 | 4.06245862 | 4.73809233 | 5.52402105 | 6.43791379 |
| 64 | 3.55149324 | 4.15386394 | 4.85654464 | 5.67593162 | 6.63105120 |
| 65 | 3.62252311 | 4.24732588 | 4.97795826 | 5.83201974 | 6.82998273 |
| 66 | 3.69497357 | 4.34289071 | 5.10240721 | 5.99240029 | 7.03488222 |
| 67 | 3.76887304 | 4.44060576 | 5.22996739 | 6.15719130 | 7.24592868 |
| 68 | 3.84425050 | 4.54051939 | 5.36071658 | 6.32651406 | 7.46330654 |
| 69 | 3.92113551 | 4.64268107 | 5.49473449 | 6.50049319 | 7.68720574 |
| 70 | 3.99955822 | 4.74714140 | 5.63210286 | 6.67925676 | 7.91782191 |
| 71 | 4.07954939 | 4.85395208 | 5.77290543 | 6.86293632 | 8.15535657 |
| 72 | 4.16114038 | 4.96316600 | 5.91722806 | 7.05166706 | 8.40001727 |
| 73 | 4.24436318 | 5.07483723 | 6.06515876 | 7.24558791 | 8.65201778 |
| 74 | 4.32925045 | 5.18902107 | 6.21678773 | 7.44484158 | 8.91157832 |
| 75 | 4.41583546 | 5.30577405 | 6.37220743 | 7.64957472 | 9.17892567 |
| 76 | 4.50415216 | 5.42515396 | 6.53151261 | 7.85993802 | 9.45429344 |
| 77 | 4.59423521 | 5.54721993 | 6.69480043 | 8.07608632 | 9.73792224 |
| 78 | 4.68611991 | 5.67203237 | 6.86217044 | 8.29817869 | 10.0300599 |
| 79 | 4.77984231 | 5.79965310 | 7.03372470 | 8.52637861 | 10.3309617 |
| 80 | 4.87543916 | 5.93014530 | 7.20956782 | 8.76085402 | 10.6408906 |
| 81 | 4.97294794 | 6.06357357 | 7.38980701 | 9.00177751 | 10.9601173 |
| 82 | 5.07240690 | 6.20000397 | 7.57455219 | 9.24932639 | 11.2889208 |
| 83 | 5.17385504 | 6.33950406 | 7.76391599 | 9.50368286 | 11.6275884 |
| 84 | 5.27733214 | 6.48214290 | 7.95801389 | 9.76503414 | 11.9764161 |
| 85 | 5.38287878 | 6.62799112 | 8.15696424 | 10.0335726 | 12.3357085 |
| 86 | 5.49053636 | 6.77712092 | 8.36088834 | 10.3094958 | 12.7057798 |
| 87 | 5.60034708 | 6.92960614 | 8.56991055 | 10.5930070 | 13.0869532 |
| 88 | 5.71235402 | 7.08552228 | 8.78415832 | 10.8843147 | 13.4795618 |
| 89 | 5.82660110 | 7.24494653 | 9.00376228 | 11.1836333 | 13.8839487 |
| 90 | 5.94313313 | 7.40795782 | 9.22885633 | 11.4911832 | 14.3004671 |
| 91 | 6.06199579 | 7.57463688 | 9.45957774 | 11.8071908 | 14.7294811 |
| 92 | 6.18323570 | 7.74506621 | 9.69606718 | 12.1318885 | 15.1713656 |
| 93 | 6.30690042 | 7.91933020 | 9.93846886 | 12.4655154 | 15.6265065 |
| 94 | 6.43303843 | 8.09751512 | 10.1869306 | 12.8083171 | 16.0953017 |
| 95 | 6.56189920 | 8.27970921 | 10.4416038 | 13.1605458 | 16.5781608 |
| 96 | 6.69293318 | 8.46600267 | 10.7026439 | 13.5224608 | 17.0755056 |
| 97 | 6.82679184 | 8.65648773 | 10.9702100 | 13.8943285 | 17.5877708 |
| 98 | 6.96332768 | 8.85125871 | 11.2444653 | 14.2764226 | 18.1154039 |
| 99 | 7.10259423 | 9.05041203 | 11.5255769 | 14.6690242 | 18.6588660 |
| 100 | 7.24464612 | 9.25404630 | 11.8137164 | 15.0724223 | 19.2186320 |

INTEREST TABLES (Continued)

AMOUNT AT COMPOUND INTEREST $(1 + i)^n$ (Continued)

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|---------------|------------|------------|------------|------------|
| | .035(3½ %) | .04(4 %) | .045(4½ %) | .05(5 %) | .055(5½ %) |
| 1 | 1.03500000 | 1.04000000 | 1.04500000 | 1.05000000 | 1.05500000 |
| 2 | 1.07122500 | 1.08160000 | 1.09202500 | 1.10250000 | 1.11302500 |
| 3 | 1.10871788 | 1.12486400 | 1.14116613 | 1.15762500 | 1.17424138 |
| 4 | 1.14752300 | 1.16985856 | 1.19251860 | 1.21550625 | 1.23882465 |
| 5 | 1.18768631 | 1.21665290 | 1.24618194 | 1.27628156 | 1.30696001 |
| 6 | 1.22925533 | 1.26531902 | 1.30226012 | 1.34009564 | 1.37884281 |
| 7 | 1.27227926 | 1.31593178 | 1.36086183 | 1.40710042 | 1.45467916 |
| 8 | 1.31680904 | 1.36856905 | 1.42210061 | 1.47745544 | 1.53468651 |
| 9 | 1.36289735 | 1.42331181 | 1.48609514 | 1.55132822 | 1.61909427 |
| 10 | 1.41059876 | 1.48024428 | 1.55296942 | 1.62889463 | 1.70814446 |
| 11 | 1.45996972 | 1.53945406 | 1.62285305 | 1.71033936 | 1.80209240 |
| 12 | 1.51106866 | 1.60103222 | 1.69588143 | 1.79585633 | 1.90120749 |
| 13 | 1.56395606 | 1.66507351 | 1.77219610 | 1.88564914 | 2.00577390 |
| 14 | 1.61869452 | 1.73167645 | 1.85194492 | 1.97993160 | 2.11609146 |
| 15 | 1.67534883 | 1.80094351 | 1.93528244 | 2.07892818 | 2.23247649 |
| 16 | 1.73398604 | 1.87298125 | 2.02237015 | 2.18287459 | 2.35526270 |
| 17 | 1.79467555 | 1.94790050 | 2.11337681 | 2.29201832 | 2.48480215 |
| 18 | 1.85748920 | 2.02581652 | 2.20847877 | 2.40661923 | 2.62146627 |
| 19 | 1.92250132 | 2.10684918 | 2.30786031 | 2.52695020 | 2.76564691 |
| 20 | 1.98978886 | 2.19112314 | 2.41171402 | 2.65329771 | 2.91775749 |
| 21 | 2.05943147 | 2.27876807 | 2.52024116 | 2.78596259 | 3.07823415 |
| 22 | 2.13151158 | 2.36991879 | 2.63365201 | 2.92526072 | 3.24753703 |
| 23 | 2.20611448 | 2.46471554 | 2.75216635 | 3.07152376 | 3.42615157 |
| 24 | 2.28332849 | 2.56330416 | 2.87601383 | 3.22509994 | 3.61458990 |
| 25 | 2.36324498 | 2.66583633 | 3.00543446 | 3.38635494 | 3.81339235 |
| 26 | 2.44595856 | 2.77246978 | 3.14067901 | 3.5567269 | 4.02312893 |
| 27 | 2.53156711 | 2.88336858 | 3.28200956 | 3.73345632 | 4.24440102 |
| 28 | 2.62017196 | 2.99870332 | 3.42969999 | 3.92012914 | 4.47784307 |
| 29 | 2.71187798 | 3.11865145 | 3.58403649 | 4.11613560 | 4.72412444 |
| 30 | 2.80679370 | 3.24339751 | 3.74531813 | 4.32194238 | 4.98395129 |
| 31 | 2.90503148 | 3.37313341 | 3.91385745 | 4.53803949 | 5.25806861 |
| 32 | 3.00670759 | 3.50805875 | 4.08998104 | 4.76494147 | 5.54726238 |
| 33 | 3.11194235 | 3.64838110 | 4.27403018 | 5.00318854 | 5.85236181 |
| 34 | 3.22086033 | 3.79431634 | 4.46636154 | 5.25334797 | 6.17424171 |
| 35 | 3.33359045 | 3.94608899 | 4.66734781 | 5.51601537 | 6.51382501 |
| 36 | 3.45026611 | 4.10393255 | 4.87737846 | 5.79181614 | 6.87208538 |
| 37 | 3.57102543 | 4.26808986 | 5.09686049 | 6.08140694 | 7.25005008 |
| 38 | 3.69601132 | 4.43881345 | 5.32621921 | 6.38547729 | 7.64880283 |
| 39 | 3.82537171 | 4.61636599 | 5.56589908 | 6.70475115 | 8.06948699 |
| 40 | 3.95925972 | 4.80102063 | 5.81636454 | 7.03998871 | 8.51330877 |
| 41 | 4.09783381 | 4.99306145 | 6.07810094 | 7.39198815 | 8.98154076 |
| 42 | 4.24125799 | 5.19278391 | 6.35161548 | 7.76158756 | 9.47552550 |
| 43 | 4.38970202 | 5.40049527 | 6.63743818 | 8.14966693 | 9.99667940 |
| 44 | 4.54334160 | 5.61651508 | 6.93612290 | 8.55715028 | 10.5464968 |
| 45 | 4.70235855 | 5.84117568 | 7.24824843 | 8.98500779 | 11.1265541 |
| 46 | 4.86694110 | 6.07482271 | 7.57441961 | 9.43425818 | 11.7385146 |
| 47 | 5.03728404 | 6.31781562 | 7.91526849 | 9.90597109 | 12.3841329 |
| 48 | 5.21358898 | 6.57052824 | 8.27145557 | 10.4012696 | 13.0652602 |
| 49 | 5.39606459 | 6.83334937 | 8.64367107 | 10.9213331 | 13.7838495 |
| 50 | 5.58492686 | 7.10668335 | 9.03263627 | 11.4673998 | 14.5419612 |

INTEREST TABLES (Continued)

AMOUNT AT COMPOUND INTEREST $(1 + i)^n$ (Continued)

| Years | Rate i | | | | |
|-------|------------|-------------|------------|-------------|------------|
| n | .06 (6 %) | .065 (6½ %) | .07 (7 %) | .075 (7½ %) | .08 (8 %) |
| 1 | 1.06000000 | 1.06500000 | 1.07000000 | 1.07500000 | 1.08000000 |
| 2 | 1.12360000 | 1.13422500 | 1.14490000 | 1.15562500 | 1.16640000 |
| 3 | 1.19101600 | 1.20794963 | 1.22504300 | 1.24229688 | 1.25971200 |
| 4 | 1.26247696 | 1.28646635 | 1.31079601 | 1.33546914 | 1.36048896 |
| 5 | 1.33822558 | 1.37008666 | 1.40255173 | 1.43562933 | 1.46932808 |
| 6 | 1.41851911 | 1.45914230 | 1.50073035 | 1.54330153 | 1.58687432 |
| 7 | 1.50363026 | 1.55398655 | 1.60578148 | 1.65904914 | 1.71382427 |
| 8 | 1.59384807 | 1.65499567 | 1.71818618 | 1.78347783 | 1.85093021 |
| 9 | 1.68947896 | 1.76257039 | 1.83845921 | 1.91723866 | 1.99900463 |
| 10 | 1.79084770 | 1.87713747 | 1.96715136 | 2.06103156 | 2.15892500 |
| 11 | 1.89829856 | 1.99915140 | 2.10485195 | 2.21560893 | 2.33163900 |
| 12 | 2.01219647 | 2.12909624 | 2.25219159 | 2.38177960 | 2.51817012 |
| 13 | 2.13292826 | 2.26748750 | 2.40984500 | 2.56041307 | 2.71962373 |
| 14 | 2.26090396 | 2.41487418 | 2.57853415 | 2.75244405 | 2.93719362 |
| 15 | 2.39655819 | 2.57184101 | 2.75903154 | 2.95887735 | 3.17216911 |
| 16 | 2.54035168 | 2.73901067 | 2.95216375 | 3.18079315 | 3.42594264 |
| 17 | 2.69277279 | 2.91704637 | 3.15881521 | 3.41935264 | 3.70001805 |
| 18 | 2.85433915 | 3.10665438 | 3.37993228 | 3.67580409 | 3.99601950 |
| 19 | 3.02559950 | 3.30858691 | 3.61652754 | 3.95148940 | 4.31570106 |
| 20 | 3.20713547 | 3.52364506 | 3.86968446 | 4.24785110 | 4.66095714 |
| 21 | 3.39956360 | 3.75268199 | 4.14056237 | 4.56643993 | 5.03383372 |
| 22 | 3.60353742 | 3.99660632 | 4.43040174 | 4.90892293 | 5.43654041 |
| 23 | 3.81974966 | 4.25638573 | 4.74052986 | 5.27709215 | 5.87146365 |
| 24 | 4.04893464 | 4.53305081 | 5.07236695 | 5.67287406 | 6.34118070 |
| 25 | 4.29187072 | 4.82769911 | 5.42743264 | 6.09833961 | 6.84847520 |
| 26 | 4.54938296 | 5.14149955 | 5.80735292 | 6.55571508 | 7.39635321 |
| 27 | 4.82234594 | 5.47569702 | 6.21386763 | 7.04739371 | 7.98860147 |
| 28 | 5.11168670 | 5.83161733 | 6.64883836 | 7.57594824 | 8.62710639 |
| 29 | 5.41838790 | 6.21067245 | 7.11425705 | 8.14414436 | 9.31727490 |
| 30 | 5.74349117 | 6.61436616 | 7.61225504 | 8.75495519 | 10.0626569 |
| 31 | 6.08810064 | 7.04429996 | 8.14511290 | 9.41157683 | 10.8676694 |
| 32 | 6.45338668 | 7.50217946 | 8.71527080 | 10.1174451 | 11.7370830 |
| 33 | 6.84058988 | 7.98982113 | 9.32533975 | 10.8762535 | 12.6760496 |
| 34 | 7.25102528 | 8.50915950 | 9.97811354 | 11.6919725 | 13.6901336 |
| 35 | 7.68608679 | 9.06225487 | 10.6765815 | 12.5688704 | 14.7853443 |
| 36 | 8.14725200 | 9.65130143 | 11.4239422 | 13.5115357 | 15.9681718 |
| 37 | 8.63608712 | 10.2786360 | 12.2236181 | 14.5249009 | 17.2456256 |
| 38 | 9.15425235 | 10.9467474 | 13.0792714 | 15.6142684 | 18.6252756 |
| 39 | 9.70350749 | 11.6582859 | 13.9948204 | 16.7853386 | 20.1152977 |
| 40 | 10.2857179 | 12.4160745 | 14.9744578 | 18.0442390 | 21.7245215 |
| 41 | 10.9028610 | 13.2231194 | 16.0226699 | 19.3975569 | 23.4624832 |
| 42 | 11.5570327 | 14.0826221 | 17.1442568 | 20.8523737 | 25.3394819 |
| 43 | 12.2504546 | 14.9979926 | 18.3443548 | 22.4163017 | 27.3666404 |
| 44 | 12.9854819 | 15.9728621 | 19.6284596 | 24.0975243 | 29.5559717 |
| 45 | 13.7646108 | 17.0110981 | 21.0024518 | 25.9048386 | 31.9204494 |
| 46 | 14.5904875 | 18.1168195 | 22.4726234 | 27.8477015 | 34.4740853 |
| 47 | 15.4659167 | 19.2944128 | 24.0457070 | 29.9362791 | 37.2320122 |
| 48 | 16.3938717 | 20.5485496 | 25.7289065 | 32.1815001 | 40.2105731 |
| 49 | 17.3775040 | 21.8842053 | 27.5299300 | 34.5951126 | 43.4274190 |
| 50 | 18.4201543 | 23.3066787 | 29.4570251 | 37.1897460 | 46.9016125 |

INTEREST TABLES (Continued)

PRESENT VALUE $1/(1+i)^n$

The following table gives the value of unit amount due in n years at rate of interest i , compounded annually, $1/(1+i)^n = v^n$.

| Years | Rate i | | | | |
|-------|---------------------------|-----------------------------|--------------------------|------------------------------|---------------------------|
| n | .0025 ($\frac{1}{4}\%$) | .004167 ($\frac{1}{2}\%$) | .005 ($\frac{1}{2}\%$) | .005833 ($\frac{7}{12}\%$) | .0075 ($\frac{3}{4}\%$) |
| 1 | .99750623 | .99585062 | .99502488 | .99420050 | .99255583 |
| 2 | .99501869 | .99171846 | .99007450 | .98843463 | .98516708 |
| 3 | .99253734 | .98760345 | .98514876 | .98270220 | .97783333 |
| 4 | .99006219 | .98350551 | .98024752 | .97700301 | .97055417 |
| 5 | .98759321 | .97942457 | .97537067 | .97133688 | .96332920 |
| 6 | .98513038 | .97536057 | .97051808 | .96570361 | .95615802 |
| 7 | .98267370 | .97131343 | .96568963 | .96010301 | .94904022 |
| 8 | .98022314 | .96728308 | .96088520 | .95453489 | .94197540 |
| 9 | .97777869 | .96326946 | .95610468 | .94899906 | .93496318 |
| 10 | .97534034 | .95927249 | .95134794 | .94349534 | .92800315 |
| 11 | .97290807 | .95529211 | .94661487 | .93802354 | .92109494 |
| 12 | .97048187 | .95132824 | .94190534 | .93258347 | .91423815 |
| 13 | .96806171 | .94738082 | .93721924 | .92717495 | .90743241 |
| 14 | .96564759 | .94344978 | .93255646 | .92179779 | .90067733 |
| 15 | .96323949 | .93953505 | .92791688 | .91645182 | .89397254 |
| 16 | .96083740 | .93563657 | .92330037 | .91113686 | .88731766 |
| 17 | .95844130 | .93175426 | .91870684 | .90585272 | .88071231 |
| 18 | .95605117 | .92788806 | .91413616 | .90059922 | .87415614 |
| 19 | .95366700 | .92403790 | .90958822 | .89537619 | .86764878 |
| 20 | .95128878 | .92020372 | .90506290 | .89018346 | .86118985 |
| 21 | .94891649 | .91638544 | .90056010 | .88502084 | .85477901 |
| 22 | .94655011 | .91258301 | .89607971 | .87988815 | .84841589 |
| 23 | .94418964 | .90879636 | .89162160 | .87478524 | .84210014 |
| 24 | .94183505 | .90502542 | .88718567 | .86971192 | .83583140 |
| 25 | .93948634 | .90127013 | .88277181 | .86466802 | .82960933 |
| 26 | .93714348 | .89753042 | .87837991 | .85965338 | .82343358 |
| 27 | .93480646 | .89380623 | .87400986 | .85466782 | .81730380 |
| 28 | .93247527 | .89009749 | .86966155 | .84971117 | .81121966 |
| 29 | .93014990 | .88640414 | .86533488 | .84478327 | .80518080 |
| 30 | .92783032 | .88272611 | .86102973 | .83988394 | .79918690 |
| 31 | .92551653 | .87906335 | .85674600 | .83501303 | .79323762 |
| 32 | .92320851 | .87541578 | .85248358 | .83017037 | .78733262 |
| 33 | .92090624 | .87178335 | .84824237 | .82535580 | .78147158 |
| 34 | .91860972 | .86816599 | .84402226 | .82056914 | .77565418 |
| 35 | .91631892 | .86456365 | .83982314 | .81581025 | .76988008 |
| 36 | .91403384 | .86097624 | .83564492 | .81107896 | .76414896 |
| 37 | .91175445 | .85740373 | .83148748 | .80637510 | .75846051 |
| 38 | .90948075 | .85384604 | .82735073 | .80169853 | .75281440 |
| 39 | .90721272 | .85030311 | .82323455 | .79704907 | .74721032 |
| 40 | .90495034 | .84677488 | .81913886 | .79242659 | .74164796 |
| 41 | .90269361 | .84326129 | .81506354 | .78783091 | .73612701 |
| 42 | .90044250 | .83976228 | .81100850 | .78326188 | .73064716 |
| 43 | .89819701 | .83627779 | .80697363 | .77871935 | .72520809 |
| 44 | .89595712 | .83280776 | .80295884 | .77420316 | .71980952 |
| 45 | .89372281 | .82935212 | .79896402 | .76971317 | .71445114 |
| 46 | .89149407 | .82591083 | .79498907 | .76524922 | .70913264 |
| 47 | .88927090 | .82248381 | .79103390 | .76081115 | .70385374 |
| 48 | .88705326 | .81907102 | .78709841 | .75639883 | .69861414 |
| 49 | .88484116 | .81567238 | .78318250 | .75201209 | .69341353 |
| 50 | .88263457 | .81228785 | .77928607 | .74765079 | .68825165 |

PRESENT VALUE $1/(1+i)^n$ (Continued)

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|-------------------------|----------------------------|-------------------------|----------------------------|-------------------------|
| | .0025($\frac{1}{4}$ %) | .004167($\frac{1}{24}$ %) | .005($\frac{1}{20}$ %) | .005833($\frac{1}{17}$ %) | .0075($\frac{3}{4}$ %) |
| 50 | .88263457 | .81228785 | .77928607 | .74765079 | .68825165 |
| 51 | .88043349 | .80891736 | .77540902 | .74331479 | .68312819 |
| 52 | .87823790 | .80556086 | .77155127 | .73900393 | .67804286 |
| 53 | .87604778 | .80221828 | .76771270 | .73471808 | .67299540 |
| 54 | .87386312 | .79888957 | .76389324 | .73045708 | .66798551 |
| 55 | .87168391 | .79557468 | .76009277 | .72622079 | .66301291 |
| 56 | .86951013 | .79227354 | .75631122 | .72200907 | .65807733 |
| 57 | .86734178 | .78898610 | .75254847 | .71782178 | .65317849 |
| 58 | .86517883 | .78571230 | .74880445 | .71365877 | .64831612 |
| 59 | .86302128 | .78245208 | .74507906 | .70951990 | .64348995 |
| 60 | .86086911 | .77920539 | .74137220 | .70540504 | .63869970 |
| 61 | .85872230 | .77597217 | .73768378 | .70131404 | .63394511 |
| 62 | .85658085 | .77275237 | .73401371 | .69724677 | .62922592 |
| 63 | .85444474 | .76954593 | .73036190 | .69320308 | .62454185 |
| 64 | .85231395 | .76635279 | .72672826 | .68918285 | .61989266 |
| 65 | .85018848 | .76317291 | .72311269 | .68518593 | .61527807 |
| 66 | .84806831 | .76000621 | .71951512 | .68121219 | .61069784 |
| 67 | .84595343 | .75685266 | .71593544 | .67726150 | .60615170 |
| 68 | .84384382 | .75371219 | .71237357 | .67333372 | .60163940 |
| 69 | .84173947 | .75058476 | .70882943 | .66942872 | .59716070 |
| 70 | .83964037 | .74747030 | .70530291 | .66554637 | .59271533 |
| 71 | .837545650 | .74436876 | .70179394 | .66168653 | .58830306 |
| 72 | .83545786 | .74128009 | .69830243 | .65784908 | .58392363 |
| 73 | .83337442 | .73820424 | .69482829 | .65403388 | .57957681 |
| 74 | .83129618 | .73514115 | .69137143 | .65024081 | .57526234 |
| 75 | .82922312 | .73209078 | .68793177 | .64646973 | .57097999 |
| 76 | .82715523 | .72905306 | .68450923 | .64272053 | .56672952 |
| 77 | .82509250 | .72602794 | .68110371 | .63899306 | .56251069 |
| 78 | .82303491 | .72301537 | .67771513 | .63528723 | .55832326 |
| 79 | .82098246 | .72001531 | .67434342 | .63160288 | .55416701 |
| 80 | .81893512 | .71702770 | .67098847 | .62793989 | .55004170 |
| 81 | .81689289 | .71405248 | .66765022 | .62429816 | .54594710 |
| 82 | .81485575 | .71108960 | .66432858 | .62067754 | .54188297 |
| 83 | .81282369 | .70813902 | .66102346 | .61707792 | .53784911 |
| 84 | .81079670 | .70520069 | .65773479 | .61349917 | .53384527 |
| 85 | .80877476 | .70227454 | .65446248 | .60994118 | .52987123 |
| 86 | .80675787 | .69936054 | .65120644 | .60640382 | .52592678 |
| 87 | .80474600 | .69645863 | .64796661 | .60288698 | .52201169 |
| 88 | .80273915 | .69356876 | .64474290 | .59939054 | .51812575 |
| 89 | .80073731 | .69069088 | .64153522 | .59591437 | .51426873 |
| 90 | .79874046 | .68782495 | .63834350 | .59245836 | .51044043 |
| 91 | .79674859 | .68497090 | .63516766 | .58902240 | .50664063 |
| 92 | .79476168 | .68212870 | .63200763 | .58560636 | .50286911 |
| 93 | .79277973 | .67929829 | .62886331 | .58221014 | .49912567 |
| 94 | .79080273 | .67647962 | .62573464 | .57883361 | .49541009 |
| 95 | .78883065 | .67367265 | .62262153 | .57547666 | .49172217 |
| 96 | .78686349 | .67087733 | .61952391 | .57213918 | .48806171 |
| 97 | .78490124 | .66809361 | .61644170 | .56882106 | .48442850 |
| 98 | .78294388 | .66532143 | .61337483 | .56552218 | .48082233 |
| 99 | .78099140 | .66256076 | .61032321 | .56224243 | .47724301 |
| 100 | .77904379 | .65981155 | .60728678 | .55898171 | .47369033 |

INTEREST TABLES (Continued)

PRESENT VALUE $1/(1 + i)^n$ (Continued)

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|---------------|--------------|-------------|------------|-------------|
| | .01(1 %) | .01125(1½ %) | .0125(1¼ %) | .015(1½ %) | .0175(1¾ %) |
| 1 | .99009901 | .98887515 | .98765432 | .98522167 | .98280098 |
| 2 | .98029605 | .97787407 | .97546106 | .97066175 | .96589777 |
| 3 | .97059015 | .96699537 | .96341833 | .95631699 | .94928528 |
| 4 | .96098034 | .95623770 | .95152428 | .94218423 | .93295851 |
| 5 | .95146569 | .94559970 | .93977706 | .92826033 | .91691254 |
| 6 | .94204524 | .93508005 | .92817488 | .91454219 | .90114254 |
| 7 | .93271805 | .92467743 | .91671593 | .90102679 | .88564378 |
| 8 | .92348322 | .91439054 | .90539845 | .88771112 | .87041157 |
| 9 | .91433982 | .90421808 | .89422069 | .87459224 | .85544135 |
| 10 | .90528695 | .89415880 | .88318093 | .86166723 | .84072860 |
| 11 | .89632372 | .88421142 | .87227746 | .84893323 | .82626889 |
| 12 | .88744923 | .87437470 | .86150860 | .83638742 | .81205788 |
| 13 | .87866260 | .86464742 | .85087269 | .82402702 | .79809128 |
| 14 | .86996297 | .85502835 | .84036809 | .81184928 | .78436490 |
| 15 | .86134947 | .84551629 | .82999318 | .79985150 | .77087459 |
| 16 | .85282126 | .83611005 | .81974635 | .78803104 | .75761631 |
| 17 | .84437749 | .82680846 | .80962602 | .77638526 | .74458605 |
| 18 | .83601731 | .81761034 | .79963064 | .76491159 | .73177990 |
| 19 | .82773992 | .80851455 | .78975866 | .75360747 | .71919401 |
| 20 | .81954447 | .79951995 | .78000855 | .74247042 | .70682458 |
| 21 | .81143017 | .79062542 | .77037881 | .73149795 | .69466789 |
| 22 | .80339621 | .78182983 | .76086796 | .72068763 | .68272028 |
| 23 | .79544179 | .77313210 | .75147453 | .71003708 | .67097817 |
| 24 | .78756613 | .76453112 | .74219707 | .69954392 | .65943800 |
| 25 | .77976844 | .75602583 | .73303414 | .68920583 | .64809632 |
| 26 | .77204796 | .74761516 | .72398434 | .67902052 | .63694970 |
| 27 | .76440392 | .73929806 | .71504626 | .66898574 | .62599479 |
| 28 | .75683557 | .73107348 | .70621853 | .65909925 | .61522829 |
| 29 | .74934215 | .72294040 | .69749978 | .64935887 | .60464697 |
| 30 | .74192292 | .71489780 | .68888867 | .63976243 | .59424764 |
| 31 | .73457715 | .70694467 | .68038387 | .63030781 | .58402716 |
| 32 | .72730411 | .69908002 | .67198407 | .62099292 | .57398247 |
| 33 | .72010307 | .69130287 | .66368797 | .61181568 | .56411053 |
| 34 | .71297334 | .68361223 | .65549429 | .60277407 | .55440839 |
| 35 | .70591420 | .67600715 | .64740177 | .59386608 | .54487311 |
| 36 | .69892495 | .66848667 | .63940916 | .58508974 | .53550183 |
| 37 | .69200490 | .66104986 | .63151522 | .57644309 | .52629172 |
| 38 | .68515337 | .65369578 | .62371873 | .56792423 | .51724002 |
| 39 | .67836967 | .64642352 | .61601850 | .55953126 | .50834400 |
| 40 | .67165314 | .63923216 | .60841334 | .55126232 | .49960098 |
| 41 | .66500311 | .63212080 | .60090206 | .54311559 | .49100834 |
| 42 | .65841892 | .62508855 | .59348352 | .53508925 | .48256348 |
| 43 | .65189992 | .61813454 | .58615656 | .52718153 | .47426386 |
| 44 | .64544546 | .61125789 | .57892006 | .51939067 | .46610699 |
| 45 | .63905492 | .60445774 | .57177290 | .51171494 | .45809040 |
| 46 | .63272764 | .59773324 | .56471397 | .50415265 | .45021170 |
| 47 | .62646301 | .59108355 | .55774219 | .49670212 | .44246850 |
| 48 | .62026041 | .58450784 | .55085649 | .48936170 | .43485848 |
| 49 | .61411921 | .57800528 | .54405579 | .48212975 | .42737934 |
| 50 | .60803882 | .57157506 | .53733905 | .47500468 | .42002883 |

INTEREST TABLES (Continued)

PRESENT VALUE $1/(1 + i)^n$ (Continued)

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|---------------|--------------|-------------|------------|-------------|
| | .01(1 %) | .01125(1½ %) | .0125(1½ %) | .015(1½ %) | .0175(1½ %) |
| 50 | .60803882 | .57157506 | .53733905 | .47500468 | .42002883 |
| 51 | .60201864 | .56521637 | .53070524 | .46798491 | .41280475 |
| 52 | .59605806 | .55892843 | .52415332 | .46106887 | .40570492 |
| 53 | .59015649 | .55271044 | .51768229 | .45425505 | .39872719 |
| 54 | .58431336 | .54656162 | .51129115 | .44754192 | .39186947 |
| 55 | .57852808 | .54048120 | .50497892 | .44092800 | .38512970 |
| 56 | .57280008 | .53446843 | .49874461 | .43441182 | .37850585 |
| 57 | .56712879 | .52852256 | .49258727 | .42799194 | .37199592 |
| 58 | .56151365 | .52264282 | .48650594 | .42166694 | .36559796 |
| 59 | .55595411 | .51682850 | .48049970 | .41543541 | .35931003 |
| 60 | .55044962 | .51107887 | .47456760 | .40929597 | .35313025 |
| 61 | .54499962 | .50539319 | .46870874 | .40324726 | .34705676 |
| 62 | .53960358 | .49977077 | .46292222 | .39728794 | .34108772 |
| 63 | .53426097 | .49421090 | .45720713 | .39141669 | .33522135 |
| 64 | .52897126 | .48871288 | .45156259 | .38563221 | .32945587 |
| 65 | .52373392 | .48327602 | .44598775 | .37993321 | .32378956 |
| 66 | .51854844 | .47789965 | .44048173 | .37431843 | .31822069 |
| 67 | .51341429 | .47258309 | .43504368 | .36878663 | .31274761 |
| 68 | .50833099 | .46732568 | .42967277 | .36333658 | .30736866 |
| 69 | .50329801 | .46212675 | .42436817 | .35796708 | .30208222 |
| 70 | .49831486 | .45698566 | .41912905 | .35267692 | .29688670 |
| 71 | .49338105 | .45190177 | .41395462 | .34746495 | .29178054 |
| 72 | .48849609 | .44687443 | .40884407 | .34233000 | .28676221 |
| 73 | .48365949 | .44190302 | .40379661 | .33727093 | .28183018 |
| 74 | .47887078 | .43698692 | .39881147 | .33228663 | .27698298 |
| 75 | .47412949 | .43212551 | .39388787 | .32737599 | .27221914 |
| 76 | .46943514 | .42731818 | .38902506 | .32253793 | .26753724 |
| 77 | .46478726 | .42256433 | .38422228 | .31777136 | .26293586 |
| 78 | .46018541 | .41786337 | .37947879 | .31307523 | .25841362 |
| 79 | .45562912 | .41321470 | .37479387 | .30844850 | .25396916 |
| 80 | .45111794 | .40861775 | .37016679 | .30389015 | .24960114 |
| 81 | .44665142 | .40407194 | .36559683 | .29939916 | .24530825 |
| 82 | .44222913 | .39957670 | .36108329 | .29497454 | .24108919 |
| 83 | .43785063 | .39513148 | .35662547 | .29061531 | .23694269 |
| 84 | .43351547 | .39073570 | .35222268 | .28632050 | .23286751 |
| 85 | .42922324 | .38638882 | .34787426 | .28208917 | .22886242 |
| 86 | .42497350 | .38209031 | .34357951 | .27792036 | .22492621 |
| 87 | .42076585 | .37783961 | .33933779 | .27381316 | .22105770 |
| 88 | .41659985 | .37363621 | .33514843 | .26976666 | .21725572 |
| 89 | .41247510 | .36947956 | .33101080 | .26577996 | .21351914 |
| 90 | .40839119 | .36536916 | .32692425 | .26185218 | .20984682 |
| 91 | .40434771 | .36130448 | .32288814 | .25798245 | .20623766 |
| 92 | .40034427 | .35728503 | .31890187 | .25416990 | .20269057 |
| 93 | .39638046 | .35331029 | .31496481 | .25041369 | .19920450 |
| 94 | .39245590 | .34937976 | .31107636 | .24671300 | .19577837 |
| 95 | .38857020 | .34549297 | .30723591 | .24306699 | .19241118 |
| 96 | .38472297 | .34164941 | .30344287 | .23947487 | .18910190 |
| 97 | .38091383 | .33784861 | .29969666 | .23593583 | .18584953 |
| 98 | .37714241 | .33409010 | .29599670 | .23244909 | .18265310 |
| 99 | .37340832 | .33037340 | .29234242 | .22901389 | .17951165 |
| 100 | .36971121 | .32669805 | .28873326 | .22562944 | .17642422 |

INTEREST TABLES (Continued)

PRESENT VALUE $1/(1 + i)^n$ (Continued)

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|---------------|---------------------------|--------------------------|---------------------------|-----------|
| | .02 (2 %) | .0225 (2 $\frac{1}{4}$ %) | .025 (2 $\frac{1}{2}$ %) | .0275 (2 $\frac{3}{4}$ %) | .03 (3 %) |
| 1 | .98039216 | .97799511 | .97560976 | .97323601 | .97087379 |
| 2 | .96116878 | .95647444 | .95181440 | .94718833 | .94259591 |
| 3 | .94232233 | .93542732 | .92859941 | .92183779 | .91514166 |
| 4 | .92384543 | .91484335 | .90595064 | .89716573 | .88848705 |
| 5 | .90573081 | .89471232 | .88385429 | .87315400 | .86260878 |
| 6 | .88797138 | .87502427 | .86229687 | .84978491 | .83748426 |
| 7 | .87056018 | .85576946 | .84126524 | .82704128 | .81309151 |
| 8 | .85349037 | .83693835 | .82074657 | .80490635 | .78940923 |
| 9 | .83675527 | .81852161 | .80072836 | .78336385 | .76641673 |
| 10 | .82034830 | .80051013 | .78119840 | .76239791 | .74409391 |
| 11 | .80426304 | .78289499 | .76214478 | .74199310 | .72242128 |
| 12 | .78849318 | .76566748 | .74355589 | .72213440 | .70137988 |
| 13 | .77303253 | .74881905 | .72542038 | .70280720 | .68095134 |
| 14 | .75787502 | .73234137 | .70772720 | .68399728 | .66111781 |
| 15 | .74301473 | .71622628 | .69046556 | .66569078 | .64186195 |
| 16 | .72844581 | .70046580 | .67362493 | .64787424 | .62316694 |
| 17 | .71416256 | .68505212 | .65719506 | .63053454 | .60501645 |
| 18 | .70015937 | .66997763 | .64116591 | .61365892 | .58739461 |
| 19 | .68643076 | .65523484 | .62552772 | .59723496 | .57028603 |
| 20 | .67297133 | .64081647 | .61027094 | .58125057 | .55367575 |
| 21 | .65977582 | .62671538 | .59538629 | .56569398 | .53754928 |
| 22 | .64683904 | .61292457 | .58086467 | .55055375 | .52189250 |
| 23 | .63415592 | .59943724 | .56669724 | .53581874 | .50669175 |
| 24 | .62172149 | .58624668 | .55287535 | .52147809 | .49193374 |
| 25 | .60953087 | .57334639 | .53939059 | .50752126 | .47760557 |
| 26 | .59757928 | .56072997 | .52623472 | .49393796 | .46369473 |
| 27 | .58586204 | .54839117 | .51339973 | .48071821 | .45018906 |
| 28 | .57437455 | .53632388 | .50087778 | .46785227 | .43707675 |
| 29 | .56311231 | .52452213 | .48866125 | .45533068 | .42434636 |
| 30 | .55207089 | .51298008 | .47674269 | .44314421 | .41198676 |
| 31 | .54124597 | .50169201 | .46511481 | .43128391 | .39998715 |
| 32 | .53063330 | .49065233 | .45377055 | .41974103 | .38833703 |
| 33 | .52022873 | .47985558 | .44270298 | .40850708 | .37702625 |
| 34 | .51002817 | .46929641 | .43190534 | .39757380 | .36604490 |
| 35 | .50002761 | .45896960 | .42137107 | .38693314 | .35538340 |
| 36 | .49022315 | .44887002 | .41109372 | .37657727 | .34503243 |
| 37 | .48061093 | .43899268 | .40106705 | .36649856 | .33498294 |
| 38 | .47118719 | .42933270 | .39128492 | .35668959 | .32522615 |
| 39 | .46194822 | .41988528 | .38174139 | .34714316 | .31575355 |
| 40 | .45289042 | .41064575 | .37243062 | .33785222 | .30655684 |
| 41 | .44401021 | .40160954 | .36334695 | .32880995 | .29762800 |
| 42 | .43530413 | .39277216 | .35448483 | .32000968 | .28895922 |
| 43 | .42676875 | .38412925 | .34583886 | .31144495 | .28054294 |
| 44 | .41840074 | .37567653 | .33740376 | .30310944 | .27237178 |
| 45 | .41019680 | .36740981 | .32917440 | .29499702 | .26443862 |
| 46 | .40215373 | .35932500 | .32114576 | .28710172 | .25673653 |
| 47 | .39426836 | .35141809 | .31331294 | .27941773 | .24925876 |
| 48 | .38653761 | .34368518 | .30567116 | .27193940 | .24199880 |
| 49 | .37895844 | .33612242 | .29821576 | .26466122 | .23495029 |
| 50 | .37152788 | .32872608 | .29094221 | .25757783 | .22810708 |

INTEREST TABLES (Continued)

PRESENT VALUE $1/(1 + i)^n$ (Continued)

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|---------------|--------------|-------------|--------------|-----------|
| | .02 (2 %) | .0225 (2½ %) | .025 (2½ %) | .0275 (2¾ %) | .03 (3 %) |
| 50 | .37152788 | .32872608 | .29094221 | .25757783 | .22810708 |
| 51 | .36424302 | .32149250 | .28384606 | .25068402 | .22146318 |
| 52 | .35710100 | .31441810 | .27692298 | .24397471 | .21501280 |
| 53 | .35009902 | .30749936 | .27016876 | .23744497 | .20875029 |
| 54 | .34323433 | .30073287 | .26357928 | .23109000 | .20267019 |
| 55 | .33650425 | .29411528 | .25715052 | .22490511 | .19676717 |
| 56 | .32990613 | .28764330 | .25087855 | .21888575 | .19103609 |
| 57 | .32343738 | .28131374 | .24475956 | .21302749 | .18547193 |
| 58 | .31709547 | .27512347 | .23878982 | .20732603 | .18006984 |
| 59 | .31087791 | .26906940 | .23296568 | .20177716 | .17482508 |
| 60 | .30478227 | .26314856 | .22728359 | .19637679 | .16973309 |
| 61 | .29880614 | .25735801 | .22174009 | .19112097 | .16478941 |
| 62 | .29294720 | .25169487 | .21633179 | .18600581 | .15998972 |
| 63 | .28720314 | .24615635 | .21105541 | .18102755 | .15532982 |
| 64 | .28157170 | .24073971 | .20590771 | .17618253 | .15080565 |
| 65 | .27605069 | .23544226 | .20088557 | .17146718 | .14641325 |
| 66 | .27063793 | .23026138 | .19598593 | .16687804 | .14214879 |
| 67 | .26533130 | .22519450 | .19120578 | .16241172 | .13800853 |
| 68 | .26012873 | .22023912 | .18654223 | .15806493 | .13398887 |
| 69 | .25502817 | .21539278 | .18199241 | .15383448 | .13008628 |
| 70 | .25002761 | .21065309 | .17755358 | .14971726 | .12629736 |
| 71 | .24512511 | .20601769 | .17322300 | .14571023 | .12261880 |
| 72 | .24031874 | .20148429 | .16899805 | .14181044 | .11904737 |
| 73 | .23560661 | .19705065 | .16487615 | .13801503 | .11557998 |
| 74 | .23098687 | .19271458 | .16085478 | .13432119 | .11221357 |
| 75 | .22645771 | .18847391 | .15693149 | .13072622 | .10894521 |
| 76 | .22201737 | .18432657 | .15310389 | .12722747 | .10577205 |
| 77 | .21766408 | .18027048 | .14936965 | .12382235 | .10269131 |
| 78 | .21339616 | .17630365 | .14572649 | .12050837 | .09970030 |
| 79 | .20921192 | .17242411 | .14217218 | .11728309 | .09679641 |
| 80 | .20510973 | .16862993 | .13870457 | .11414412 | .09397710 |
| 81 | .20108797 | .16491925 | .13532153 | .11108917 | .09123990 |
| 82 | .19714507 | .16129022 | .13202101 | .10811598 | .08858243 |
| 83 | .19327948 | .15774105 | .12880098 | .10522237 | .08600236 |
| 84 | .18948968 | .15426997 | .12565949 | .10240620 | .08349743 |
| 85 | .18577420 | .15087528 | .12259463 | .09966540 | .08106547 |
| 86 | .18213157 | .14755528 | .11960452 | .09699795 | .07870434 |
| 87 | .17856036 | .14430835 | .11668733 | .09440190 | .07641198 |
| 88 | .17505918 | .14113286 | .11384130 | .09187533 | .07418639 |
| 89 | .17162665 | .13802724 | .11106468 | .08941638 | .07202562 |
| 90 | .16826142 | .13498997 | .10835579 | .08702324 | .06992779 |
| 91 | .16496217 | .13201953 | .10571296 | .08469415 | .06789105 |
| 92 | .16172762 | .12911445 | .10313460 | .08242740 | .06591364 |
| 93 | .15855649 | .12627331 | .10061912 | .08022131 | .06399383 |
| 94 | .15544754 | .12349468 | .09816500 | .07807427 | .06212993 |
| 95 | .15239955 | .12077719 | .09577073 | .07598469 | .06032032 |
| 96 | .14941132 | .11811950 | .09343486 | .07395104 | .05856342 |
| 97 | .14648169 | .11552029 | .09115596 | .07197181 | .05685769 |
| 98 | .14360950 | .11297828 | .08893264 | .07004556 | .05520164 |
| 99 | .14079363 | .11049221 | .08676355 | .06817086 | .05359383 |
| 100 | .13803297 | .10806084 | .08464737 | .06634634 | .05203284 |

INTEREST TABLES (Continued)

PRESENT VALUE $1/(1+i)^n$ (Continued)

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|---------------|-----------|------------|-----------|------------|
| | .035(3½ %) | .04(4 %) | .045(4½ %) | .05(5 %) | .055(5½ %) |
| 1 | .96618357 | .96153846 | .95693780 | .95238095 | .94786730 |
| 2 | .93351070 | .92455621 | .91572995 | .90702948 | .89845242 |
| 3 | .90194271 | .88899636 | .87629660 | .86383760 | .85161366 |
| 4 | .87144223 | .85480419 | .83856134 | .82270247 | .80721674 |
| 5 | .84197317 | .82192711 | .80245105 | .78352617 | .76513435 |
| 6 | .81350064 | .79031453 | .76789574 | .74621540 | .72524583 |
| 7 | .78599096 | .75991781 | .73482846 | .71068133 | .68743681 |
| 8 | .75941156 | .73069021 | .70318513 | .67683936 | .65159887 |
| 9 | .73373097 | .70258674 | .67290443 | .64460892 | .61762926 |
| 10 | .70891881 | .67556417 | .64392768 | .61391325 | .58543058 |
| 11 | .68494571 | .64958093 | .61619874 | .58467929 | .55491050 |
| 12 | .66178330 | .62459705 | .58966386 | .55683742 | .52598152 |
| 13 | .63940415 | .60057409 | .56427164 | .53032135 | .49856068 |
| 14 | .61778179 | .57747508 | .53997286 | .50506795 | .47256937 |
| 15 | .59689062 | .55526450 | .51672044 | .48101710 | .44793305 |
| 16 | .57670591 | .53390818 | .49446932 | .45811152 | .42458109 |
| 17 | .55720378 | .51337325 | .47317639 | .43629669 | .40244653 |
| 18 | .53836114 | .49362812 | .45280037 | .41552065 | .38146590 |
| 19 | .52015569 | .47464242 | .43330179 | .39573396 | .36157906 |
| 20 | .50256588 | .45638695 | .41464286 | .37688948 | .34272896 |
| 21 | .48557090 | .43883360 | .39678743 | .35894236 | .32486158 |
| 22 | .46915063 | .42195539 | .37970089 | .34184987 | .30792567 |
| 23 | .45328563 | .40572633 | .36335013 | .32557131 | .29187267 |
| 24 | .43795713 | .39012147 | .34770347 | .31006791 | .27665656 |
| 25 | .42314699 | .37511680 | .33273060 | .29530277 | .26223370 |
| 26 | .40883767 | .36068923 | .31840248 | .28124073 | .24856275 |
| 27 | .39501224 | .34681657 | .30469137 | .26784832 | .23560450 |
| 28 | .38165434 | .33347747 | .29157069 | .25509364 | .22332181 |
| 29 | .36874815 | .32065141 | .27901502 | .24294632 | .21167944 |
| 30 | .35627841 | .30831867 | .26700002 | .23137745 | .20064402 |
| 31 | .34423035 | .29646026 | .25550241 | .22035947 | .19018390 |
| 32 | .33258971 | .28505794 | .24449991 | .20986617 | .18026910 |
| 33 | .32134271 | .27409417 | .23397121 | .19987254 | .17087119 |
| 34 | .31047605 | .26355309 | .22389589 | .19035480 | .16196321 |
| 35 | .29997686 | .25341547 | .21425444 | .18129029 | .15351963 |
| 36 | .28983272 | .24366872 | .20502817 | .17265741 | .14551624 |
| 37 | .28003161 | .23429685 | .19619921 | .16443563 | .13793008 |
| 38 | .27056194 | .22528543 | .18775044 | .15660536 | .13073941 |
| 39 | .26141250 | .21662061 | .17966549 | .14914797 | .12392362 |
| 40 | .25257247 | .20828904 | .17192870 | .14204568 | .11746314 |
| 41 | .24403137 | .20027793 | .16452507 | .13528160 | .11133947 |
| 42 | .23577910 | .19257493 | .15744026 | .12883962 | .10553504 |
| 43 | .22780590 | .18516820 | .15066054 | .12270440 | .10003322 |
| 44 | .22010231 | .17804635 | .14417276 | .11636133 | .09481822 |
| 45 | .21265924 | .17119841 | .13796437 | .11129651 | .08987509 |
| 46 | .20546787 | .16461386 | .13202332 | .10599668 | .08518965 |
| 47 | .19851968 | .15828256 | .12633810 | .10094921 | .08074849 |
| 48 | .19180645 | .15219476 | .12089771 | .09614211 | .07653885 |
| 49 | .18532024 | .14634112 | .11569158 | .09156391 | .07254867 |
| 50 | .17905337 | .14071262 | .11070965 | .08720373 | .06876652 |

INTEREST TABLES (Continued)

PRESENT VALUE $1/(1 + i)^n$ (Continued)

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|---------------|-------------|-----------|-------------|-----------|
| | .06 (6 %) | .065 (6½ %) | .07 (7 %) | .075 (7½ %) | .08 (8 %) |
| 1 | .94339623 | .93896714 | .93457944 | .93023256 | .92592593 |
| 2 | .88999644 | .88165928 | .87343873 | .86533261 | .85733882 |
| 3 | .83961928 | .82784909 | .81629788 | .80496057 | .79383224 |
| 4 | .79209366 | .77732309 | .76289521 | .74880053 | .73502985 |
| 5 | .74725817 | .72988084 | .71298618 | .69655863 | .68058320 |
| 6 | .70496054 | .68533412 | .66634222 | .64796152 | .63016963 |
| 7 | .66505711 | .64350621 | .62274974 | .60275490 | .58349040 |
| 8 | .62741237 | .60423119 | .58200910 | .56070223 | .54026888 |
| 9 | .59189846 | .56735323 | .54393374 | .52158347 | .50024897 |
| 10 | .55839478 | .53272604 | .50834929 | .48519393 | .46319349 |
| 11 | .52678753 | .50021224 | .47509280 | .45134319 | .42888286 |
| 12 | .49696936 | .46968285 | .44401196 | .41985413 | .39711376 |
| 13 | .46883902 | .44101676 | .41496445 | .39056198 | .36769792 |
| 14 | .44230096 | .41410025 | .38781724 | .36331347 | .34046104 |
| 15 | .41726506 | .38882652 | .36244602 | .33796602 | .31524170 |
| 16 | .39364628 | .36509533 | .33873460 | .31438699 | .29189047 |
| 17 | .37136442 | .34281251 | .31657439 | .29245302 | .27026895 |
| 18 | .35034379 | .32188969 | .29586392 | .27204932 | .25024903 |
| 19 | .33051301 | .30224384 | .27650833 | .25306913 | .23171206 |
| 20 | .31180473 | .28379703 | .25841900 | .23541315 | .21454821 |
| 21 | .29415540 | .26647608 | .24151309 | .21898897 | .19865575 |
| 22 | .27750510 | .25021228 | .22571317 | .20371067 | .18394051 |
| 23 | .26179726 | .23494111 | .21094688 | .18949830 | .17031528 |
| 24 | .24697855 | .22060198 | .19714662 | .17627749 | .15769934 |
| 25 | .23299863 | .20713801 | .18424918 | .16397906 | .14601790 |
| 26 | .21981003 | .19449579 | .17219549 | .15253366 | .13520176 |
| 27 | .20736795 | .18262515 | .16093037 | .14189643 | .12518682 |
| 28 | .19563014 | .17147902 | .15040221 | .13199668 | .11591372 |
| 29 | .18455674 | .16101316 | .14056282 | .12278761 | .10732752 |
| 30 | .17411013 | .15118607 | .13136712 | .11422103 | .09937733 |
| 31 | .16425484 | .14195875 | .12277301 | .10625212 | .09201605 |
| 32 | .15495740 | .13329460 | .11474113 | .09883918 | .08520005 |
| 33 | .14618622 | .12515925 | .10723470 | .09194343 | .07888893 |
| 34 | .13791153 | .11752042 | .10021934 | .08552877 | .07304531 |
| 35 | .13010522 | .11034781 | .09366294 | .07956164 | .06763454 |
| 36 | .12274077 | .10361297 | .08753546 | .07401083 | .06262458 |
| 37 | .11579318 | .09728917 | .08180884 | .06884729 | .05798572 |
| 38 | .10923885 | .09135134 | .07645686 | .06404399 | .05369048 |
| 39 | .10305552 | .08577590 | .07145501 | .05957580 | .04971341 |
| 40 | .09722219 | .08054075 | .06678038 | .05541935 | .04603093 |
| 41 | .09171905 | .07562512 | .06241157 | .05155288 | .04262123 |
| 42 | .08652740 | .07100950 | .05832857 | .04795617 | .03946411 |
| 43 | .08162962 | .06667559 | .05451268 | .04461039 | .03654084 |
| 44 | .07700908 | .06260619 | .05094643 | .04149804 | .03383411 |
| 45 | .07265007 | .05878515 | .04761349 | .03860283 | .03132788 |
| 46 | .06853781 | .05519733 | .04449859 | .03590961 | .02900730 |
| 47 | .06465831 | .05182848 | .04158747 | .03340428 | .02685861 |
| 48 | .06099840 | .04866524 | .03886679 | .03107375 | .02486908 |
| 49 | .05754566 | .04569506 | .03632410 | .02890582 | .02302693 |
| 50 | .05428836 | .04290616 | .03394776 | .02688913 | .02132123 |

INTEREST TABLES (Continued)

AMOUNT OF ANNUITY $[(1 + i)^n - 1]/i$

The following table gives the amount of an annuity of unit value per period after a term of n periods at rate of interest of i per period; usually indicated as $(s_{\overline{n}|i})$.

| Years n | Rate i | | | | |
|--------------|--------------------------|-----------------------------|-------------------------|-----------------------------|--------------------------|
| | .0025($\frac{1}{4}\%$) | .004167($\frac{5}{12}\%$) | .005($\frac{1}{2}\%$) | .005833($\frac{7}{12}\%$) | .0075($\frac{3}{4}\%$) |
| 1 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 |
| 2 | 2.00250000 | 2.00416667 | 2.00500000 | 2.00583333 | 2.00750000 |
| 3 | 3.00750625 | 3.01251736 | 3.01502500 | 3.01753403 | 3.02255625 |
| 4 | 4.01502502 | 4.02506952 | 4.03010013 | 4.03513631 | 4.04522542 |
| 5 | 5.02506258 | 5.04184064 | 5.05025063 | 5.05867460 | 5.07555641 |
| 6 | 6.03762523 | 6.06284831 | 6.07550188 | 6.08818354 | 6.11363135 |
| 7 | 7.05271930 | 7.08811018 | 7.10587939 | 7.12369794 | 7.15948358 |
| 8 | 8.07035110 | 8.11764397 | 8.14140879 | 8.16525285 | 8.21317971 |
| 9 | 9.09052697 | 9.15146749 | 9.18211583 | 9.21288349 | 9.27477856 |
| 10 | 10.1132533 | 10.1895986 | 10.2280264 | 10.2666253 | 10.3443394 |
| 11 | 11.1385364 | 11.2320553 | 11.2791665 | 11.3265140 | 11.4219219 |
| 12 | 12.1663828 | 12.2788555 | 12.3355624 | 12.3925853 | 12.5075864 |
| 13 | 13.1967987 | 13.3300174 | 13.3972402 | 13.4648754 | 13.6013933 |
| 14 | 14.2297907 | 14.3855591 | 14.4642264 | 14.5434205 | 14.7034037 |
| 15 | 15.2653652 | 15.4454990 | 15.5365475 | 15.6282571 | 15.8136792 |
| 16 | 16.3035286 | 16.5098552 | 16.6142303 | 16.7194219 | 16.9322818 |
| 17 | 17.3442874 | 17.5786463 | 17.6973014 | 17.8169519 | 18.0592739 |
| 18 | 18.3876481 | 18.6518906 | 18.7857879 | 18.9208841 | 19.1947185 |
| 19 | 19.4336173 | 19.7296068 | 19.8797169 | 20.0312559 | 20.3386789 |
| 20 | 20.4822013 | 20.8118135 | 20.9791154 | 21.1481049 | 21.4912190 |
| 21 | 21.5334068 | 21.8985294 | 22.0840110 | 22.2714689 | 22.6524031 |
| 22 | 22.5872403 | 22.9897733 | 23.1944311 | 23.4013858 | 23.8222961 |
| 23 | 23.6437084 | 24.0855640 | 24.3104032 | 24.5378939 | 25.0009634 |
| 24 | 24.7028177 | 25.1859205 | 25.4319552 | 25.6810316 | 26.1884706 |
| 25 | 25.7645747 | 26.2908619 | 26.5591150 | 26.8308376 | 27.3848841 |
| 26 | 26.8289862 | 27.4004071 | 27.6919106 | 27.9873508 | 28.5902707 |
| 27 | 27.8960587 | 28.5145755 | 28.8303701 | 29.1506104 | 29.8046978 |
| 28 | 28.9657988 | 29.6333862 | 29.9745220 | 30.3206556 | 31.0282330 |
| 29 | 30.0382133 | 30.7568587 | 31.1243946 | 31.4975261 | 32.2609448 |
| 30 | 31.1133088 | 31.8850122 | 32.2800166 | 32.6812616 | 33.5029018 |
| 31 | 32.1910921 | 33.0178665 | 33.4414167 | 33.8719023 | 34.7541736 |
| 32 | 33.2715698 | 34.1554409 | 34.6086237 | 35.0694884 | 36.0148299 |
| 33 | 34.3547488 | 35.2977552 | 35.7816669 | 36.2740604 | 37.2849411 |
| 34 | 35.4406356 | 36.4448292 | 36.9605752 | 37.4856591 | 38.5645782 |
| 35 | 36.5292372 | 37.5966827 | 38.1453781 | 38.7043255 | 39.8538125 |
| 36 | 37.6205603 | 38.7533355 | 39.3361050 | 39.9301007 | 41.1527161 |
| 37 | 38.7146117 | 39.9148078 | 40.5327855 | 41.1630263 | 42.4613615 |
| 38 | 39.8113982 | 41.0811195 | 41.7354494 | 42.4031440 | 43.7798217 |
| 39 | 40.9109267 | 42.2522908 | 42.9441267 | 43.6504956 | 45.1081704 |
| 40 | 42.0132041 | 43.4283420 | 44.1588473 | 44.9051235 | 46.4464816 |
| 41 | 43.1182371 | 44.6092934 | 45.3796415 | 46.1670701 | 47.7948303 |
| 42 | 44.2260327 | 45.7951655 | 46.6065397 | 47.4363780 | 49.1532915 |
| 43 | 45.3365977 | 46.9859787 | 47.8395724 | 48.7130902 | 50.5219412 |
| 44 | 46.4499392 | 48.1817536 | 49.0787703 | 49.9972499 | 51.9008557 |
| 45 | 47.5660641 | 49.3825109 | 50.3241642 | 51.2889005 | 53.2901121 |
| 46 | 48.6849792 | 50.5882713 | 51.5757850 | 52.5880858 | 54.6897880 |
| 47 | 49.8066917 | 51.7990558 | 52.8336639 | 53.8948496 | 56.0999614 |
| 48 | 50.9312084 | 53.0148852 | 54.0978322 | 55.2092362 | 57.5207111 |
| 49 | 52.0585364 | 54.2357806 | 55.3683214 | 56.5312901 | 58.9521164 |
| 50 | 53.1886828 | 55.4617630 | 56.6451630 | 57.8610559 | 60.3942573 |

INTEREST TABLES (Continued)

AMOUNT OF ANNUITY $[(1 + i)^n - 1]/i$ (Continued)

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|--------------------------|----------------------------|-------------------------|----------------------------|--------------------------|
| | .0025($\frac{1}{4}\%$) | .004167($\frac{1}{2}\%$) | .005($\frac{1}{2}\%$) | .005833($\frac{3}{4}\%$) | .0075($\frac{3}{4}\%$) |
| 50 | 53.1886828 | 55.4617630 | 56.6451630 | 57.8610559 | 60.3942573 |
| 51 | 54.3216545 | 56.6928537 | 57.9283888 | 59.1985788 | 61.8472142 |
| 52 | 55.4574586 | 57.9290739 | 59.2180307 | 60.5439038 | 63.3110684 |
| 53 | 56.5961023 | 59.1704450 | 60.5141209 | 61.8970766 | 64.7859014 |
| 54 | 57.7375925 | 60.4169885 | 61.8166915 | 63.2581429 | 66.2717956 |
| 55 | 58.8819365 | 61.6687260 | 63.1257750 | 64.6271487 | 67.7688341 |
| 56 | 60.0291413 | 62.9256790 | 64.4414038 | 66.0041404 | 69.2771003 |
| 57 | 61.1792142 | 64.1878694 | 65.7636109 | 67.3891646 | 70.7966786 |
| 58 | 62.3321622 | 65.4553188 | 67.0924289 | 68.7822680 | 72.3276537 |
| 59 | 63.4879926 | 66.7280493 | 68.4278911 | 70.1834979 | 73.8701111 |
| 60 | 64.6467126 | 68.0060828 | 69.7700305 | 71.5929016 | 75.4241369 |
| 61 | 65.8083294 | 69.2894415 | 71.1188807 | 73.0105269 | 76.9898180 |
| 62 | 66.9728502 | 70.5781475 | 72.4744751 | 74.4364216 | 78.5672416 |
| 63 | 68.1402824 | 71.8722231 | 73.8368474 | 75.8706341 | 80.1564959 |
| 64 | 69.3106331 | 73.1716907 | 75.2060317 | 77.3132128 | 81.7576696 |
| 65 | 70.4839096 | 74.4765728 | 76.5820618 | 78.7642065 | 83.3708521 |
| 66 | 71.6601194 | 75.7868918 | 77.9649721 | 80.2236644 | 84.9961335 |
| 67 | 72.8392697 | 77.1026706 | 79.3547970 | 81.6916358 | 86.6336045 |
| 68 | 74.0213679 | 78.4239317 | 80.7515710 | 83.1681703 | 88.2833566 |
| 69 | 75.2064213 | 79.7506981 | 82.1553288 | 84.6533180 | 89.9454817 |
| 70 | 76.3944374 | 81.0829926 | 83.5661055 | 86.1471290 | 91.6200729 |
| 71 | 77.5854235 | 82.4208384 | 84.9839360 | 87.6496539 | 93.3072234 |
| 72 | 78.7793870 | 83.7642586 | 86.4088557 | 89.1609436 | 95.0070276 |
| 73 | 79.9763355 | 85.1132763 | 87.8409000 | 90.6810491 | 96.7195803 |
| 74 | 81.1762763 | 86.4679150 | 89.2801045 | 92.2100219 | 98.4449771 |
| 75 | 82.3792170 | 87.8281980 | 90.7265050 | 93.7479137 | 100.183314 |
| 76 | 83.5851651 | 89.1941488 | 92.1801375 | 95.2947765 | 101.934689 |
| 77 | 84.7941280 | 90.5657911 | 93.6410382 | 96.8506627 | 103.699199 |
| 78 | 86.0061133 | 91.9431485 | 95.1092434 | 98.4156249 | 105.476943 |
| 79 | 87.2211286 | 93.3262450 | 96.5847896 | 99.9897160 | 107.268021 |
| 80 | 88.4391814 | 94.7151044 | 98.0677136 | 101.572989 | 109.072531 |
| 81 | 89.6602793 | 96.1097506 | 99.5580521 | 103.165498 | 110.890575 |
| 82 | 90.8844300 | 97.5102079 | 101.055842 | 104.767297 | 112.722254 |
| 83 | 92.1116411 | 98.9165004 | 102.561122 | 106.378440 | 114.567671 |
| 84 | 93.3419202 | 100.328653 | 104.073927 | 107.998981 | 116.426928 |
| 85 | 94.5752750 | 101.746689 | 105.594297 | 109.628975 | 118.300130 |
| 86 | 95.8117132 | 103.170633 | 107.122268 | 111.268477 | 120.187381 |
| 87 | 97.0512425 | 104.600511 | 108.657880 | 112.917543 | 122.088787 |
| 88 | 98.2938706 | 106.036346 | 110.201169 | 114.576229 | 124.004453 |
| 89 | 99.5396053 | 107.478164 | 111.752175 | 116.244590 | 125.934486 |
| 90 | 100.788454 | 108.925990 | 113.310936 | 117.922684 | 127.878995 |
| 91 | 102.040425 | 110.379848 | 114.877490 | 119.610566 | 129.838087 |
| 92 | 103.295526 | 111.839764 | 116.451878 | 121.308294 | 131.811873 |
| 93 | 104.553765 | 113.305763 | 118.034137 | 123.015926 | 133.800462 |
| 94 | 105.815150 | 114.777871 | 119.624308 | 124.733519 | 135.803965 |
| 95 | 107.079688 | 116.256112 | 121.222430 | 126.461131 | 137.822495 |
| 96 | 108.347387 | 117.740512 | 122.828542 | 128.198821 | 139.856164 |
| 97 | 109.618255 | 119.231098 | 124.442684 | 129.946647 | 141.905085 |
| 98 | 110.892301 | 120.727894 | 126.064898 | 131.704670 | 143.969373 |
| 99 | 112.169532 | 122.230927 | 127.695222 | 133.472947 | 146.049143 |
| 100 | 113.449955 | 123.740222 | 129.333698 | 135.251539 | 148.144512 |

INTEREST TABLES (Continued)

AMOUNT OF ANNUITY $[(1 + i)^n - 1]/i$ (Continued)

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|---------------|----------------------------|---------------------------|--------------------------|---------------------------|
| | .01(1%) | .01125($1\frac{1}{8}\%$) | .0125($1\frac{1}{4}\%$) | .015($1\frac{1}{2}\%$) | .0175($1\frac{3}{4}\%$) |
| 1 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 |
| 2 | 2.01000000 | 2.01125000 | 2.01250000 | 2.01500000 | 2.01750000 |
| 3 | 3.03010000 | 3.03387656 | 3.03765625 | 3.04522500 | 3.05280625 |
| 4 | 4.06040100 | 4.06800767 | 4.07562695 | 4.09090338 | 4.10623036 |
| 5 | 5.10100501 | 5.11377276 | 5.12657229 | 5.15226693 | 5.17808939 |
| 6 | 6.15201506 | 6.17130270 | 6.19065444 | 6.22955093 | 6.26870596 |
| 7 | 7.21353521 | 7.24072986 | 7.26803762 | 7.32299419 | 7.37840831 |
| 8 | 8.28567056 | 8.32218807 | 8.35888809 | 8.43283911 | 8.50753045 |
| 9 | 9.36852727 | 9.41581269 | 9.46337420 | 9.55933169 | 9.65641224 |
| 10 | 10.4622125 | 10.5217406 | 10.5816664 | 10.7027217 | 10.8253995 |
| 11 | 11.5668347 | 11.6401102 | 11.7139372 | 11.8632625 | 12.0148439 |
| 12 | 12.6825030 | 12.7710614 | 12.8603614 | 13.0412114 | 13.2251037 |
| 13 | 13.8093280 | 13.9147358 | 14.0211159 | 14.2368296 | 14.4565430 |
| 14 | 14.9474213 | 15.0712766 | 15.1963799 | 15.4503820 | 15.7095325 |
| 15 | 16.0968955 | 16.2408285 | 16.3863346 | 16.6821378 | 16.9844493 |
| 16 | 17.2578645 | 17.4235378 | 17.5911638 | 17.9323698 | 18.2816772 |
| 17 | 18.4304431 | 18.6195526 | 18.8110534 | 19.2013554 | 19.6016066 |
| 18 | 19.6147476 | 19.8290226 | 20.0461915 | 20.4893757 | 20.9446347 |
| 19 | 20.8108950 | 21.0520991 | 21.2967689 | 21.7967164 | 22.3111658 |
| 20 | 22.0190040 | 22.2889352 | 22.5629785 | 23.1236671 | 23.7016112 |
| 21 | 23.2391940 | 23.5396857 | 23.8450158 | 24.4705221 | 25.1163894 |
| 22 | 24.4715860 | 24.8045072 | 25.1430785 | 25.8375799 | 26.5559262 |
| 23 | 25.7163018 | 26.0835579 | 26.4573669 | 27.2251436 | 28.0206549 |
| 24 | 26.9734649 | 27.3769979 | 27.7880840 | 28.6335208 | 29.5110164 |
| 25 | 28.2431995 | 28.6849891 | 29.1354351 | 30.0630236 | 31.0274592 |
| 26 | 29.5256315 | 30.0076953 | 30.4996280 | 31.5193690 | 32.5704397 |
| 27 | 30.8208878 | 31.3452818 | 31.8808734 | 32.9866785 | 34.1404224 |
| 28 | 32.1290967 | 32.6979162 | 33.2793843 | 34.4814787 | 35.7378798 |
| 29 | 33.4503877 | 34.0657678 | 34.6953766 | 35.9987009 | 37.3632927 |
| 30 | 34.7848915 | 35.4490077 | 36.1290688 | 37.5386814 | 39.0171503 |
| 31 | 36.1327404 | 36.8478090 | 37.5806822 | 39.1017616 | 40.6999504 |
| 32 | 37.4940679 | 38.2623469 | 39.0504407 | 40.6882880 | 42.4121996 |
| 33 | 38.8690085 | 39.6927983 | 40.5385712 | 42.2986123 | 44.1544130 |
| 34 | 40.2576986 | 41.1393423 | 42.0453033 | 43.9330915 | 45.9271153 |
| 35 | 41.6602756 | 42.6021599 | 43.5708696 | 45.5920879 | 47.7308398 |
| 36 | 43.0768784 | 44.0814342 | 45.1155055 | 47.2759692 | 49.5661295 |
| 37 | 44.5076471 | 45.5773503 | 46.6794493 | 48.9851087 | 51.4335368 |
| 38 | 45.9527236 | 47.0900955 | 48.2629424 | 50.7198854 | 53.3336236 |
| 39 | 47.4122508 | 48.6198591 | 49.8662292 | 52.4866837 | 55.2669621 |
| 40 | 48.8863734 | 50.1668325 | 51.4895571 | 54.2678939 | 57.2341339 |
| 41 | 50.3752371 | 51.7312093 | 53.1331765 | 56.0819123 | 59.2357312 |
| 42 | 51.8789895 | 53.3131854 | 54.7973412 | 57.9231410 | 61.2723565 |
| 43 | 53.3977794 | 54.9129588 | 56.4823080 | 59.7919881 | 63.3446281 |
| 44 | 54.9317572 | 56.5307296 | 58.1883369 | 61.6888679 | 65.4531537 |
| 45 | 56.4810747 | 58.1667003 | 59.9156911 | 63.6142010 | 67.5985839 |
| 46 | 58.0458855 | 59.8210757 | 61.6646372 | 65.5684140 | 69.7815591 |
| 47 | 59.6263443 | 61.4940628 | 63.4354452 | 67.5519402 | 72.0027364 |
| 48 | 61.2226078 | 63.1858710 | 65.2283882 | 69.5652193 | 74.2627843 |
| 49 | 62.8348338 | 64.8967120 | 67.0437431 | 71.6086976 | 76.5623830 |
| 50 | 64.4631822 | 66.6268000 | 68.8817899 | 73.6828280 | 78.9022247 |

INTEREST TABLES (Continued)

AMOUNT OF ANNUITY $[(1 + i)^n - 1]/i$ (Continued)

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|---------------|-------------|------------|------------|------------|
| | .01(1%) | .01125(1½%) | .0125(1½%) | .015(1½%) | .0175(1½%) |
| 50 | 64.4631822 | 66.6268000 | 68.8817899 | 73.6828280 | 78.9022247 |
| 51 | 66.1078140 | 68.3763515 | 70.7428123 | 75.7880705 | 81.2830136 |
| 52 | 67.7688921 | 70.1455855 | 72.6270974 | 77.9248915 | 83.7054663 |
| 53 | 69.4465811 | 71.9347233 | 74.5349361 | 80.0937649 | 86.1703120 |
| 54 | 71.1410469 | 73.7439890 | 76.4666228 | 82.2951714 | 88.6782925 |
| 55 | 72.8524573 | 75.5736088 | 78.4224556 | 84.5295989 | 91.2301626 |
| 56 | 74.5809819 | 77.4238119 | 80.4027363 | 86.7975429 | 93.8266904 |
| 57 | 76.3267917 | 79.2948298 | 82.4077705 | 89.0995061 | 96.4686575 |
| 58 | 78.0900597 | 81.1868966 | 84.4378676 | 91.4359987 | 99.1568590 |
| 59 | 79.8709603 | 83.1002492 | 86.4933410 | 93.8075386 | 101.892104 |
| 60 | 81.6696699 | 85.0351270 | 88.5745078 | 96.2146517 | 104.675216 |
| 61 | 83.4863666 | 86.9917722 | 90.6816891 | 98.6578715 | 107.507032 |
| 62 | 85.3212302 | 88.9704297 | 92.8152102 | 101.137740 | 110.388405 |
| 63 | 87.1744425 | 90.9713470 | 94.9754003 | 103.654806 | 113.320202 |
| 64 | 89.0461869 | 92.9947746 | 97.1625928 | 106.209628 | 116.303306 |
| 65 | 90.9366488 | 95.0409659 | 99.3771253 | 108.802772 | 119.338614 |
| 66 | 92.8460153 | 97.1101767 | 101.619339 | 111.434814 | 122.427039 |
| 67 | 94.7744755 | 99.2026662 | 103.889581 | 114.106336 | 125.569513 |
| 68 | 96.7222202 | 101.318696 | 106.188201 | 116.817931 | 128.766979 |
| 69 | 98.6894424 | 103.458532 | 108.515553 | 119.570200 | 132.020401 |
| 70 | 100.676337 | 105.622440 | 110.871998 | 122.363753 | 135.330758 |
| 71 | 102.683100 | 107.810692 | 113.257898 | 125.199209 | 138.699047 |
| 72 | 104.709931 | 110.023563 | 115.673621 | 128.077197 | 142.126280 |
| 73 | 106.757031 | 112.261328 | 118.119542 | 130.998355 | 145.613490 |
| 74 | 108.824601 | 114.524268 | 120.596036 | 133.963331 | 149.161726 |
| 75 | 110.912847 | 116.812666 | 123.103486 | 136.972781 | 152.772056 |
| 76 | 113.021975 | 119.126808 | 125.642280 | 140.027372 | 156.445567 |
| 77 | 115.152195 | 121.466985 | 128.212809 | 143.127783 | 160.183364 |
| 78 | 117.303717 | 123.833488 | 130.815469 | 146.274700 | 163.986573 |
| 79 | 119.476754 | 126.226615 | 133.450662 | 149.468820 | 167.856338 |
| 80 | 121.671522 | 128.646665 | 136.118795 | 152.710852 | 171.793824 |
| 81 | 123.888237 | 131.093940 | 138.820280 | 156.001515 | 175.800216 |
| 82 | 126.127119 | 133.568746 | 141.555534 | 159.341538 | 179.876720 |
| 83 | 128.388390 | 136.071395 | 144.324978 | 162.731661 | 184.024563 |
| 84 | 130.672274 | 138.602198 | 147.129040 | 166.172636 | 188.244992 |
| 85 | 132.978997 | 141.161473 | 149.968153 | 169.665226 | 192.539280 |
| 86 | 135.308787 | 143.749539 | 152.842755 | 173.210204 | 196.908717 |
| 87 | 137.661875 | 146.366722 | 155.753289 | 176.808357 | 201.354620 |
| 88 | 140.038494 | 149.013347 | 158.700206 | 180.460482 | 205.878326 |
| 89 | 142.438879 | 151.689747 | 161.683958 | 184.167390 | 210.481196 |
| 90 | 144.863267 | 154.396257 | 164.705008 | 187.929900 | 215.164617 |
| 91 | 147.311900 | 157.133215 | 167.763820 | 191.748849 | 219.929998 |
| 92 | 149.785019 | 159.900964 | 170.860868 | 195.625082 | 224.778773 |
| 93 | 152.282869 | 162.699849 | 173.996629 | 199.559458 | 229.712401 |
| 94 | 154.805698 | 165.530223 | 177.171587 | 203.552850 | 234.732369 |
| 95 | 157.353755 | 168.392438 | 180.386232 | 207.606142 | 239.840185 |
| 96 | 159.927293 | 171.286853 | 183.641059 | 211.720235 | 245.037388 |
| 97 | 162.526565 | 174.213830 | 186.936573 | 215.896038 | 250.325542 |
| 98 | 165.151831 | 177.173735 | 190.273280 | 220.134479 | 255.706239 |
| 99 | 167.803349 | 180.166940 | 193.651696 | 224.436496 | 261.181099 |
| 100 | 170.481383 | 183.193818 | 197.072342 | 228.803043 | 266.751768 |

INTEREST TABLES (Continued)

AMOUNT OF ANNUITY $[(1 + i)^n - 1]/i$ (Continued)

| Years | Rate i | | | | |
|-------|------------|-------------|------------|-------------|------------|
| n | .02(2 %) | .0225(2¼ %) | .025(2½ %) | .0275(2¾ %) | .03(3 %) |
| 1 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 |
| 2 | 2.02000000 | 2.02250000 | 2.02500000 | 2.02750000 | 2.03000000 |
| 3 | 3.06040000 | 3.06800625 | 3.07562500 | 3.08325625 | 3.09090000 |
| 4 | 4.12160800 | 4.13703639 | 4.15251563 | 4.16804580 | 4.18362700 |
| 5 | 5.20404016 | 5.23011971 | 5.25632852 | 5.28266706 | 5.30913581 |
| 6 | 6.30812096 | 6.34779740 | 6.38773673 | 6.42794040 | 6.46840988 |
| 7 | 7.43428338 | 7.49062284 | 7.54743015 | 7.60470876 | 7.66246218 |
| 8 | 8.58296905 | 8.65916186 | 8.73611590 | 8.81383825 | 8.89233605 |
| 9 | 9.75462843 | 9.85399300 | 9.95451880 | 10.0562188 | 10.1591061 |
| 10 | 10.9497210 | 11.0757078 | 11.2033818 | 11.3327648 | 11.4638793 |
| 11 | 12.1687154 | 12.3249113 | 12.4834663 | 12.6444159 | 12.8077957 |
| 12 | 13.4120897 | 13.6022218 | 13.7955530 | 13.9921373 | 14.1920296 |
| 13 | 14.6803315 | 14.9082718 | 15.1404418 | 15.3769211 | 15.6177904 |
| 14 | 15.9739382 | 16.2437079 | 16.5189528 | 16.7997864 | 17.0863242 |
| 15 | 17.2934169 | 17.6091913 | 17.9319267 | 18.2617805 | 18.5989139 |
| 16 | 18.6392853 | 19.0053981 | 19.3802248 | 19.7639795 | 20.1568813 |
| 17 | 20.0120710 | 20.4330196 | 20.8647304 | 21.3074889 | 21.7615877 |
| 18 | 21.4123124 | 21.8927625 | 22.3863487 | 22.8934449 | 23.4144354 |
| 19 | 22.8405586 | 23.3853497 | 23.9460074 | 24.5230146 | 25.1168684 |
| 20 | 24.2973698 | 24.9115200 | 25.5446576 | 26.1973975 | 26.8703745 |
| 21 | 25.7833172 | 26.4720292 | 27.1832741 | 27.9178259 | 28.6764857 |
| 22 | 27.2989835 | 28.0676499 | 28.8628559 | 29.6855661 | 30.5367803 |
| 23 | 28.8449632 | 29.6991720 | 30.5844273 | 31.5019192 | 32.4528837 |
| 24 | 30.4218625 | 31.3674034 | 32.3490380 | 33.3682220 | 34.4264702 |
| 25 | 32.0302997 | 33.0731700 | 34.1577639 | 35.2858481 | 36.4592643 |
| 26 | 33.6709057 | 34.8173163 | 36.0117080 | 37.2562089 | 38.5530423 |
| 27 | 35.3443238 | 36.6007059 | 37.9120007 | 39.2807547 | 40.7096335 |
| 28 | 37.0512103 | 38.4242218 | 39.8598008 | 41.3609754 | 42.9309225 |
| 29 | 38.7922345 | 40.2887668 | 41.8562958 | 43.4984022 | 45.2188502 |
| 30 | 40.5680792 | 42.1952640 | 43.9027032 | 45.6946083 | 47.5754157 |
| 31 | 42.3794408 | 44.1446575 | 46.0002707 | 47.9512100 | 50.0026782 |
| 32 | 44.2270296 | 46.1379123 | 48.1502775 | 50.2698683 | 52.5027585 |
| 33 | 46.1115702 | 48.1760153 | 50.3540344 | 52.6522897 | 55.0778413 |
| 34 | 48.0338016 | 50.2599756 | 52.6128853 | 55.1002277 | 57.7301765 |
| 35 | 49.9944776 | 52.3908251 | 54.9282074 | 57.6154839 | 60.4620818 |
| 36 | 51.9943672 | 54.5696186 | 57.3014126 | 60.1999097 | 63.2759443 |
| 37 | 54.0342545 | 56.7974351 | 59.7339479 | 62.8554072 | 66.1742226 |
| 38 | 56.1149396 | 59.0753774 | 62.2272966 | 65.5839309 | 69.1594493 |
| 39 | 58.2372384 | 61.4045733 | 64.7829791 | 68.3874890 | 72.2342328 |
| 40 | 60.4019832 | 63.7861762 | 67.4025535 | 71.2681450 | 75.4012597 |
| 41 | 62.6100228 | 66.2213652 | 70.0876174 | 74.2280190 | 78.6632975 |
| 42 | 64.8622233 | 68.7113459 | 72.8398078 | 77.2692895 | 82.0231965 |
| 43 | 67.1594678 | 71.2573512 | 75.6608030 | 80.3941950 | 85.4838923 |
| 44 | 69.5026571 | 73.8606416 | 78.5523231 | 83.6050353 | 89.0484091 |
| 45 | 71.8927103 | 76.5225060 | 81.5161312 | 86.9041738 | 92.7198614 |
| 46 | 74.3305645 | 79.2442624 | 84.5540344 | 90.2940386 | 96.5014572 |
| 47 | 76.8171758 | 82.0272583 | 87.6678853 | 93.7771246 | 100.396601 |
| 48 | 79.3535193 | 84.8728716 | 90.8595824 | 97.3559956 | 104.408396 |
| 49 | 81.9405897 | 87.7825113 | 94.1310720 | 101.033285 | 108.540648 |
| 50 | 84.5794015 | 90.7576178 | 97.4843488 | 104.811701 | 112.796867 |

INTEREST TABLES (Continued)

AMOUNT OF ANNUITY $[(1 + i)^n - 1]/i$ (Continued)

| Years | Rate i | | | | |
|-------|------------|-------------|------------|-------------|------------|
| n | .02(2 %) | .0225(2¼ %) | .025(2½ %) | .0275(2¾ %) | .03(3 %) |
| 50 | 84.5794015 | 90.7576178 | 97.4843488 | 104.811701 | 112.796867 |
| 51 | 87.2709895 | 93.7996642 | 100.921458 | 108.694023 | 117.180773 |
| 52 | 90.0164093 | 96.9101566 | 104.444494 | 112.683108 | 121.696197 |
| 53 | 92.8167375 | 100.090635 | 108.055606 | 116.781894 | 126.347082 |
| 54 | 95.6730722 | 103.342674 | 111.756996 | 120.993396 | 131.137495 |
| 55 | 98.5865337 | 106.667885 | 115.550921 | 125.320714 | 136.071620 |
| 56 | 101.558264 | 110.067912 | 119.439694 | 129.767034 | 141.153768 |
| 57 | 104.589430 | 113.544440 | 123.425687 | 134.335627 | 146.388381 |
| 58 | 107.681218 | 117.099190 | 127.511329 | 139.029857 | 151.780033 |
| 59 | 110.834843 | 120.733922 | 131.699112 | 143.853178 | 157.333434 |
| 60 | 114.051539 | 124.450435 | 135.991590 | 148.809140 | 163.053437 |
| 61 | 117.332570 | 128.250570 | 140.391380 | 153.901392 | 168.945040 |
| 62 | 120.679222 | 132.136208 | 144.901164 | 159.133680 | 175.013391 |
| 63 | 124.092806 | 136.109272 | 149.523693 | 164.509856 | 181.263793 |
| 64 | 127.574662 | 140.171731 | 154.261786 | 170.033877 | 187.701707 |
| 65 | 131.126155 | 144.325595 | 159.118330 | 175.709809 | 194.332758 |
| 66 | 134.748679 | 148.572921 | 164.096289 | 181.541829 | 201.162741 |
| 67 | 138.443652 | 152.915811 | 169.198696 | 187.534229 | 208.197623 |
| 68 | 142.212525 | 157.356417 | 174.428663 | 193.691420 | 215.443551 |
| 69 | 146.056776 | 161.896937 | 179.789380 | 200.017934 | 222.906858 |
| 70 | 149.977911 | 166.539618 | 185.284114 | 206.518427 | 230.594064 |
| 71 | 153.977469 | 171.286759 | 190.916217 | 213.197684 | 238.511886 |
| 72 | 158.057019 | 176.140711 | 196.689122 | 220.060621 | 246.667242 |
| 73 | 162.218159 | 181.103877 | 202.606351 | 227.112288 | 255.067259 |
| 74 | 166.462522 | 186.178714 | 208.671509 | 234.357876 | 263.719277 |
| 75 | 170.791773 | 191.367735 | 214.888297 | 241.802717 | 272.630856 |
| 76 | 175.207608 | 196.673509 | 221.260504 | 249.452292 | 281.809781 |
| 77 | 179.711760 | 202.098663 | 227.792017 | 257.312230 | 291.264075 |
| 78 | 184.305996 | 207.645883 | 234.486818 | 265.388316 | 301.001997 |
| 79 | 188.992115 | 213.317916 | 241.348988 | 273.686495 | 311.032057 |
| 80 | 193.771958 | 219.117569 | 248.382713 | 282.212873 | 321.363019 |
| 81 | 198.647397 | 225.047714 | 255.592280 | 290.973727 | 332.003909 |
| 82 | 203.620345 | 231.111288 | 262.982087 | 299.975505 | 342.964026 |
| 83 | 208.692752 | 237.311292 | 270.556640 | 309.224831 | 354.252947 |
| 84 | 213.866607 | 243.650796 | 278.320556 | 318.728514 | 365.880536 |
| 85 | 219.143939 | 250.132939 | 286.278570 | 328.493548 | 377.856952 |
| 86 | 224.526818 | 256.760930 | 294.435534 | 338.527121 | 390.192660 |
| 87 | 230.017354 | 263.538051 | 302.796422 | 348.836617 | 402.898440 |
| 88 | 235.617701 | 270.467657 | 311.366333 | 359.429624 | 415.985393 |
| 89 | 241.330055 | 277.553179 | 320.150491 | 370.313938 | 429.464955 |
| 90 | 247.156656 | 284.798126 | 329.154253 | 381.497572 | 443.348904 |
| 91 | 253.099789 | 292.206083 | 338.383110 | 392.988755 | 457.649371 |
| 92 | 259.161785 | 299.780720 | 347.842687 | 404.795946 | 472.378852 |
| 93 | 265.345021 | 307.525786 | 357.538755 | 416.927834 | 487.550217 |
| 94 | 271.651921 | 315.445117 | 367.477223 | 429.393350 | 503.176724 |
| 95 | 278.084960 | 323.542632 | 377.664154 | 442.201667 | 519.272026 |
| 96 | 284.646659 | 331.822341 | 388.105758 | 455.362213 | 535.850186 |
| 97 | 291.339592 | 340.288344 | 398.808402 | 468.884673 | 552.925692 |
| 98 | 298.166384 | 348.944831 | 409.778612 | 482.779002 | 570.513463 |
| 99 | 305.129712 | 357.796090 | 421.023077 | 497.055424 | 588.628867 |
| 100 | 312.232306 | 366.846502 | 432.548654 | 511.724449 | 607.287733 |

INTEREST TABLES (Continued)

AMOUNT OF ANNUITY $[(1 + i)^n - 1]/i$ (Continued)

| Years | Rate i | | | | |
|-------|--------------------------|------------|--------------------------|------------|--------------------------|
| n | .035($3\frac{1}{2}\%$) | .04(4%) | .045($4\frac{1}{2}\%$) | .05(5%) | .055($5\frac{1}{2}\%$) |
| 1 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 |
| 2 | 2.03500000 | 2.04000000 | 2.04500000 | 2.05000000 | 2.05500000 |
| 3 | 3.10622500 | 3.12160000 | 3.13702500 | 3.15250000 | 3.16802500 |
| 4 | 4.21494288 | 4.24646400 | 4.27819113 | 4.31012500 | 4.34226638 |
| 5 | 5.36246588 | 5.41632256 | 5.47070973 | 5.52563125 | 5.58109103 |
| 6 | 6.55015218 | 6.63297546 | 6.71689166 | 6.80191281 | 6.88805103 |
| 7 | 7.77940751 | 7.89829448 | 8.01915179 | 8.14200845 | 8.26689384 |
| 8 | 9.05168677 | 9.21422626 | 9.38001362 | 9.54910888 | 9.72157300 |
| 9 | 10.3684958 | 10.5827953 | 10.8021142 | 11.0265643 | 11.2562595 |
| 10 | 11.7313932 | 12.0061071 | 12.2882094 | 12.5778925 | 12.8753538 |
| 11 | 13.1419919 | 13.4863514 | 13.8411788 | 14.2067872 | 14.5834982 |
| 12 | 14.6019616 | 15.0258055 | 15.4640318 | 15.9171265 | 16.3855907 |
| 13 | 16.1130303 | 16.6268377 | 17.1599133 | 17.7129828 | 18.2867981 |
| 14 | 17.6769864 | 18.2919112 | 18.9321094 | 19.5986320 | 20.2925720 |
| 15 | 19.2956809 | 20.0235876 | 20.7840543 | 21.5785636 | 22.4086635 |
| 16 | 20.9710297 | 21.8245311 | 22.7193367 | 23.6574918 | 24.6411400 |
| 17 | 22.7050157 | 23.6975124 | 24.7417069 | 25.8403664 | 26.9964027 |
| 18 | 24.4996913 | 25.6454129 | 26.8550837 | 28.1323847 | 29.4812048 |
| 19 | 26.3571805 | 27.6712294 | 29.0635625 | 30.5390039 | 32.1026711 |
| 20 | 28.2796818 | 29.7780786 | 31.3714228 | 33.0659541 | 34.8683180 |
| 21 | 30.2694707 | 31.9692017 | 33.7831368 | 35.7192518 | 37.7860755 |
| 22 | 32.3289022 | 34.2479698 | 36.3033780 | 38.5052144 | 40.8643097 |
| 23 | 34.4604137 | 36.6178886 | 38.9370300 | 41.4304751 | 44.1118467 |
| 24 | 36.6665282 | 39.0826041 | 41.6891963 | 44.5019989 | 47.5379983 |
| 25 | 38.9498567 | 41.6459083 | 44.5652101 | 47.7270988 | 51.1525882 |
| 26 | 41.3131017 | 44.3117446 | 47.5706446 | 51.1134538 | 54.9659805 |
| 27 | 43.7590602 | 47.0842144 | 50.7113236 | 54.6691264 | 58.9891094 |
| 28 | 46.2906273 | 49.9675830 | 53.9933332 | 58.4025828 | 63.2335105 |
| 29 | 48.9107993 | 52.9662863 | 57.4230332 | 62.3227119 | 67.7113535 |
| 30 | 51.6226773 | 56.0849378 | 61.0070697 | 66.4388475 | 72.4354780 |
| 31 | 54.4294710 | 59.3283353 | 64.7523878 | 70.7607899 | 77.4194293 |
| 32 | 57.3345025 | 62.7014687 | 68.6662452 | 75.2988294 | 82.6774979 |
| 33 | 60.3412101 | 66.2095274 | 72.7562263 | 80.0637708 | 88.2247603 |
| 34 | 63.4531524 | 69.8579085 | 77.0302565 | 85.0669594 | 94.0771221 |
| 35 | 66.6740127 | 73.6522249 | 81.4966180 | 90.3203074 | 100.251364 |
| 36 | 70.0076032 | 77.5983138 | 86.1639658 | 95.8363227 | 106.765189 |
| 37 | 73.4578693 | 81.7022464 | 91.0413443 | 101.628139 | 113.637274 |
| 38 | 77.0288947 | 85.9703363 | 96.1382048 | 107.709546 | 120.887324 |
| 39 | 80.7249060 | 90.4091497 | 101.464424 | 114.095023 | 128.536127 |
| 40 | 84.5502777 | 95.0255157 | 107.030323 | 120.799774 | 136.605614 |
| 41 | 88.5095375 | 99.8265363 | 112.846688 | 127.839763 | 145.118923 |
| 42 | 92.6073713 | 104.819598 | 118.924789 | 135.231751 | 154.100464 |
| 43 | 96.8486293 | 110.012382 | 125.276404 | 142.993339 | 163.575989 |
| 44 | 101.238331 | 115.412877 | 131.913842 | 151.143006 | 173.572669 |
| 45 | 105.781673 | 121.029392 | 138.849965 | 159.700156 | 184.119165 |
| 46 | 110.484031 | 126.870568 | 146.098214 | 168.685164 | 195.245719 |
| 47 | 115.350973 | 132.945390 | 153.672633 | 178.119422 | 206.984234 |
| 48 | 120.388257 | 139.263206 | 161.587902 | 188.025393 | 219.368367 |
| 49 | 125.601846 | 145.833734 | 169.859357 | 198.426663 | 232.433627 |
| 50 | 130.997910 | 152.667084 | 178.503028 | 209.347996 | 246.217476 |

INTEREST TABLES (Continued)

AMOUNT OF ANNUITY $[(1 + i)^n - 1]/i$ (Continued)

| Year <i>n</i> | Rate <i>i</i> | | | | |
|------------------|---------------|------------|------------|------------|------------|
| | .06(6%) | .065(6½%) | .07(7%) | .075(7½%) | .08(8%) |
| 1 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 |
| 2 | 2.06000000 | 2.06500000 | 2.07000000 | 2.07500000 | 2.08000000 |
| 3 | 3.18360000 | 3.19922500 | 3.21490000 | 3.23062500 | 3.24640000 |
| 4 | 4.37461600 | 4.40717463 | 4.43994300 | 4.47292188 | 4.50611200 |
| 5 | 5.63709296 | 5.69364098 | 5.75073901 | 5.80839102 | 5.86660096 |
| 6 | 6.97531854 | 7.06372764 | 7.15329074 | 7.24402034 | 7.33592904 |
| 7 | 8.39383765 | 8.52286994 | 8.65402109 | 8.78732187 | 8.92280336 |
| 8 | 9.89746791 | 10.0768565 | 10.2598026 | 10.4463710 | 10.6366276 |
| 9 | 11.4913160 | 11.7318522 | 11.9779887 | 12.2298488 | 12.4875578 |
| 10 | 13.1807949 | 13.4944225 | 13.8164480 | 14.1470875 | 14.4865625 |
| 11 | 14.9716426 | 15.3715600 | 15.7835993 | 16.2081191 | 16.6454875 |
| 12 | 16.8699412 | 17.3707114 | 17.8884513 | 18.4237280 | 18.9771265 |
| 13 | 18.8821377 | 19.4998076 | 20.1406429 | 20.8055076 | 21.4952966 |
| 14 | 21.0150659 | 21.7672951 | 22.5504879 | 23.3659207 | 24.2149203 |
| 15 | 23.2759699 | 24.1821693 | 25.1290220 | 26.1183647 | 27.1521139 |
| 16 | 25.6725281 | 26.7540103 | 27.8880536 | 29.0772421 | 30.3242830 |
| 17 | 28.2128798 | 29.4930210 | 30.8402173 | 32.2580352 | 33.7502257 |
| 18 | 30.9056525 | 32.4100674 | 33.9990325 | 35.6773879 | 37.4502437 |
| 19 | 33.7599917 | 35.5167218 | 37.3789648 | 39.3531919 | 41.4462632 |
| 20 | 36.7855912 | 38.8253087 | 40.9954923 | 43.3046813 | 45.7619643 |
| 21 | 39.9927267 | 42.3489537 | 44.8651768 | 47.5525324 | 50.4229214 |
| 22 | 43.3922903 | 46.1016357 | 49.0057392 | 52.1189724 | 55.4567552 |
| 23 | 46.9958277 | 50.0982420 | 53.4361409 | 57.0278953 | 60.8932956 |
| 24 | 50.8155774 | 54.3546278 | 58.1766708 | 62.3049874 | 66.7647592 |
| 25 | 54.8645120 | 58.8876786 | 63.2490377 | 67.9778615 | 73.1059400 |
| 26 | 59.1563827 | 63.7153777 | 68.6764704 | 74.0762011 | 79.9544151 |
| 27 | 63.7057657 | 68.8568772 | 74.4838233 | 80.6319162 | 87.3507684 |
| 28 | 68.5281116 | 74.3325743 | 80.6976909 | 87.6793099 | 95.3388298 |
| 29 | 73.6397983 | 80.1641916 | 87.3465293 | 95.2552582 | 103.965936 |
| 30 | 79.0581862 | 86.3748640 | 94.4607863 | 103.399403 | 113.283211 |
| 31 | 84.8016774 | 92.9892302 | 102.073041 | 112.154358 | 123.345868 |
| 32 | 90.8897780 | 100.033530 | 110.218154 | 121.565935 | 134.213537 |
| 33 | 97.3431647 | 107.535710 | 118.933425 | 131.683380 | 145.950620 |
| 34 | 104.183755 | 115.525531 | 128.258765 | 142.559633 | 158.626670 |
| 35 | 111.434780 | 124.034690 | 138.236878 | 154.251606 | 172.316804 |
| 36 | 119.120867 | 133.096945 | 148.913460 | 166.820476 | 187.102148 |
| 37 | 127.268119 | 142.748247 | 160.337402 | 180.332012 | 203.070320 |
| 38 | 135.904206 | 153.026883 | 172.561020 | 194.856913 | 220.315945 |
| 39 | 145.058458 | 163.973630 | 185.640292 | 210.471181 | 238.941221 |
| 40 | 154.761966 | 175.631916 | 199.635112 | 227.256520 | 259.056519 |
| 41 | 165.047684 | 188.047990 | 214.609570 | 245.300759 | 280.781040 |
| 42 | 175.950545 | 201.271110 | 230.632240 | 264.698315 | 304.243523 |
| 43 | 187.507577 | 215.353732 | 247.776496 | 285.550689 | 329.583005 |
| 44 | 199.758032 | 230.351725 | 266.120851 | 307.966991 | 356.949646 |
| 45 | 212.743514 | 246.324587 | 285.749311 | 332.064515 | 386.505617 |
| 46 | 226.508125 | 263.335685 | 306.751763 | 357.969354 | 418.426067 |
| 47 | 241.098612 | 281.452504 | 329.224386 | 385.817055 | 452.900152 |
| 48 | 256.564529 | 300.746917 | 353.270093 | 415.753334 | 490.132164 |
| 49 | 272.958401 | 321.295467 | 378.999000 | 447.934835 | 530.342737 |
| 50 | 290.335905 | 343.179672 | 406.528929 | 482.529947 | 573.770156 |

INTEREST TABLES (Continued)

PRESENT VALUE OF ANNUITY $[1 - (1 + i)^{-n}]/i$

The following table gives the present value of an annuity of unit value per period for a term of n periods at rate of interest i per period; usually indicated as $a_{\overline{n}|}$ at i .

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|--------------------------|----------------------------|-------------------------|----------------------------|--------------------------|
| | .0025($\frac{1}{4}\%$) | .004167($\frac{1}{2}\%$) | .005($\frac{1}{2}\%$) | .005833($\frac{3}{4}\%$) | .0075($\frac{3}{4}\%$) |
| 1 | 0.99750623 | 0.99585062 | 0.99502488 | 0.99420050 | 0.99255583 |
| 2 | 1.99252492 | 1.98756908 | 1.98509938 | 1.98263513 | 1.97772291 |
| 3 | 2.98506227 | 2.97517253 | 2.97024814 | 2.96533732 | 2.95555624 |
| 4 | 3.97512446 | 3.95867804 | 3.95049566 | 3.94234034 | 3.92611041 |
| 5 | 4.96271766 | 4.93810261 | 4.92586633 | 4.91367722 | 4.88943961 |
| 6 | 5.94784804 | 5.91346318 | 5.89638441 | 5.87938083 | 5.84559763 |
| 7 | 6.93052174 | 6.88477661 | 6.86207404 | 6.83948384 | 6.79463785 |
| 8 | 7.91074487 | 7.85205970 | 7.82295924 | 7.79401874 | 7.73661325 |
| 9 | 8.88852357 | 8.81532916 | 8.77906392 | 8.74301780 | 8.67157642 |
| 10 | 9.86386391 | 9.77460165 | 9.73041186 | 9.68651314 | 9.59957958 |
| 11 | 10.8367720 | 10.7298938 | 10.6770267 | 10.6245367 | 10.5206745 |
| 12 | 11.8072538 | 11.6812220 | 11.6189321 | 11.5571201 | 11.4349127 |
| 13 | 12.7753156 | 12.6286028 | 12.5561513 | 12.4842951 | 12.3423451 |
| 14 | 13.7409631 | 13.5720526 | 13.4887078 | 13.4060929 | 13.2430224 |
| 15 | 14.7042026 | 14.5115877 | 14.4166246 | 14.3225447 | 14.1369950 |
| 16 | 15.6650400 | 15.4472242 | 15.3399250 | 15.2336816 | 15.0243126 |
| 17 | 16.6234813 | 16.3789785 | 16.2586319 | 16.1395343 | 15.9050249 |
| 18 | 17.5795325 | 17.3068665 | 17.1727680 | 17.0401335 | 16.7791811 |
| 19 | 18.5331995 | 18.2309044 | 18.0823562 | 17.9355097 | 17.6468298 |
| 20 | 19.4844883 | 19.1511082 | 18.9874191 | 18.8256931 | 18.5080197 |
| 21 | 20.4334048 | 20.0674936 | 19.8879793 | 19.7107140 | 19.3627987 |
| 22 | 21.3799549 | 20.9800766 | 20.7840590 | 20.5906021 | 20.2112146 |
| 23 | 22.3241445 | 21.8888730 | 21.6756806 | 21.4653874 | 21.0533147 |
| 24 | 23.2659796 | 22.7938984 | 22.5628662 | 22.3350993 | 21.8891461 |
| 25 | 24.2054659 | 23.6951685 | 23.4456380 | 23.1997673 | 22.7187555 |
| 26 | 25.1426094 | 24.5926989 | 24.3240179 | 24.0594207 | 23.5421891 |
| 27 | 26.0774158 | 25.4865052 | 25.1980278 | 24.9140885 | 23.3594929 |
| 28 | 27.0098911 | 26.3766027 | 26.0676894 | 25.7637997 | 25.1707125 |
| 29 | 27.9400410 | 27.2630068 | 26.9330242 | 26.6085830 | 25.9758933 |
| 30 | 28.8678713 | 28.1457329 | 27.7940540 | 27.4484669 | 26.7750802 |
| 31 | 29.7933879 | 29.0247963 | 28.6508000 | 28.2834799 | 27.5683178 |
| 32 | 30.7165964 | 29.9002120 | 29.5032835 | 29.1136503 | 28.3556504 |
| 33 | 31.6375026 | 30.7719954 | 30.3515259 | 29.9390061 | 29.1371220 |
| 34 | 32.5561123 | 31.6401614 | 31.1955482 | 30.7595752 | 29.9127762 |
| 35 | 33.4724313 | 32.5047250 | 32.0353713 | 31.5753855 | 30.6826563 |
| 36 | 34.3864651 | 33.3657013 | 32.8710162 | 32.3864645 | 31.4468053 |
| 37 | 35.2982196 | 34.2231050 | 33.7025037 | 33.1928396 | 32.2052658 |
| 38 | 36.2077003 | 35.0769511 | 34.5298544 | 33.9945381 | 32.9580802 |
| 39 | 37.1149130 | 35.9272542 | 35.3530890 | 34.7915872 | 33.7052905 |
| 40 | 38.0198634 | 36.7740290 | 36.1722279 | 35.5840137 | 34.4469384 |
| 41 | 38.9225570 | 37.6172903 | 36.9872914 | 36.3718446 | 35.1830654 |
| 42 | 39.8229995 | 38.4570526 | 37.7982999 | 37.1551065 | 35.9137126 |
| 43 | 40.7211965 | 39.2933304 | 38.6052735 | 37.9338259 | 36.6389207 |
| 44 | 41.6171536 | 40.1261382 | 39.4082324 | 38.7080290 | 37.3587302 |
| 45 | 42.5108764 | 40.9554903 | 40.2071964 | 39.4777422 | 38.0731814 |
| 46 | 43.4023705 | 41.7814011 | 41.0021855 | 40.2429914 | 38.7823140 |
| 47 | 44.2916414 | 42.6038849 | 41.7932194 | 41.0038026 | 39.4861677 |
| 48 | 45.1786946 | 43.4229559 | 42.5803178 | 41.7602014 | 40.1847819 |
| 49 | 46.0635358 | 44.2386283 | 43.3635003 | 42.5122135 | 40.8781954 |
| 50 | 46.9461704 | 45.0509162 | 44.1427864 | 43.2598643 | 41.5664471 |

INTEREST TABLES (Continued)

PRESENT VALUE OF ANNUITY $[1 - (1 + i)^{-n}]/i$ (Continued)

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|--------------------------|-----------------------------|-------------------------|-----------------------------|--------------------------|
| | .0025($\frac{1}{4}\%$) | .004167($\frac{5}{12}\%$) | .005($\frac{1}{2}\%$) | .005833($\frac{7}{12}\%$) | .0075($\frac{3}{4}\%$) |
| 50 | 46.9461704 | 45.0509162 | 44.1427864 | 43.2598643 | 41.5664471 |
| 51 | 47.8266039 | 45.8598335 | 44.9181954 | 44.0031791 | 42.2495753 |
| 52 | 48.7048418 | 46.6653944 | 45.6897466 | 44.7421830 | 42.9276181 |
| 53 | 49.5808895 | 47.4676127 | 46.4574593 | 45.4769011 | 43.6006135 |
| 54 | 50.4547527 | 48.2665022 | 47.2213526 | 46.2073582 | 44.2685990 |
| 55 | 51.3264366 | 49.0620769 | 47.9814454 | 46.9335789 | 44.9316119 |
| 56 | 52.1959467 | 49.8543505 | 48.7377566 | 47.6555880 | 45.5896893 |
| 57 | 53.0632885 | 50.6433366 | 49.4903050 | 48.3734098 | 46.2428678 |
| 58 | 53.9284673 | 51.4290489 | 50.2391095 | 49.0870686 | 46.8911839 |
| 59 | 54.7914886 | 52.2115009 | 50.9841886 | 49.7965885 | 47.5346738 |
| 60 | 55.6523577 | 52.9907063 | 51.7255608 | 50.5019935 | 48.1733735 |
| 61 | 56.5110800 | 53.7666785 | 52.4632445 | 51.2033075 | 48.8073186 |
| 62 | 57.3676608 | 54.5394309 | 53.1972582 | 51.9005543 | 49.4365445 |
| 63 | 58.2221056 | 55.3089768 | 53.9276201 | 52.5937574 | 50.0610864 |
| 64 | 59.0744195 | 56.0753296 | 54.6543484 | 53.2829402 | 50.6809791 |
| 65 | 59.9246080 | 56.8385025 | 55.3774611 | 53.9681262 | 51.2962571 |
| 66 | 60.7726763 | 57.5985087 | 56.0969762 | 54.6493384 | 51.9069550 |
| 67 | 61.6186297 | 58.3553614 | 56.8129117 | 55.3265999 | 52.5131067 |
| 68 | 62.4624736 | 59.1090736 | 57.5252852 | 55.9999336 | 53.1147461 |
| 69 | 63.3042130 | 59.8596583 | 58.2341147 | 56.6693623 | 53.7119068 |
| 70 | 64.1438534 | 60.6071286 | 58.9394176 | 57.3349087 | 54.3046221 |
| 71 | 64.9813999 | 61.3514974 | 59.6412115 | 57.9965952 | 54.8929252 |
| 72 | 65.8168577 | 62.0927775 | 60.3395139 | 58.6544443 | 55.4768488 |
| 73 | 66.6502322 | 62.8309817 | 61.0343422 | 59.3084781 | 56.0564256 |
| 74 | 67.4815283 | 63.5661229 | 61.7257137 | 59.9587190 | 56.6316879 |
| 75 | 68.3107515 | 64.2982136 | 62.4136454 | 60.6051887 | 57.2026679 |
| 76 | 69.1379067 | 65.0272667 | 63.0981547 | 61.2479092 | 57.7693975 |
| 77 | 69.9629992 | 65.7532946 | 63.7792584 | 61.8869023 | 58.3319081 |
| 78 | 70.7860341 | 66.4763100 | 64.4569735 | 62.5221895 | 58.8902314 |
| 79 | 71.6070166 | 67.1963253 | 65.1313169 | 63.1537924 | 59.4443984 |
| 80 | 72.4259517 | 67.9133530 | 65.8023054 | 63.7817323 | 59.9944401 |
| 81 | 73.2428446 | 68.6274055 | 66.4699556 | 64.4060304 | 60.5403872 |
| 82 | 74.0577003 | 69.3384951 | 67.1342842 | 65.0267080 | 61.0822702 |
| 83 | 74.8705240 | 70.0466341 | 67.7953076 | 65.6437859 | 61.6201193 |
| 84 | 75.6813207 | 70.7518348 | 68.4530424 | 66.2572851 | 62.1539646 |
| 85 | 76.4900955 | 71.4541094 | 69.1075049 | 66.8672262 | 62.6838358 |
| 86 | 77.2968533 | 72.1534699 | 69.7587114 | 67.4736301 | 63.2097626 |
| 87 | 78.1015993 | 72.8499285 | 70.4066780 | 68.0765171 | 63.7317743 |
| 88 | 78.9043385 | 73.5434973 | 71.0514209 | 68.6759076 | 64.2499000 |
| 89 | 79.7050758 | 74.2341882 | 71.6929561 | 69.2718220 | 64.7641688 |
| 90 | 80.5038163 | 74.9220131 | 72.3312996 | 69.8642803 | 65.2746092 |
| 91 | 81.3005649 | 75.6069840 | 72.9664672 | 70.4533027 | 65.7812498 |
| 92 | 82.0953265 | 76.2891127 | 73.5984749 | 71.0389091 | 66.2841189 |
| 93 | 82.8881063 | 76.9684110 | 74.2273382 | 71.6211192 | 66.7832446 |
| 94 | 83.6789090 | 77.6448906 | 74.8530728 | 72.1999528 | 67.2786547 |
| 95 | 84.4677397 | 78.3185633 | 75.4756943 | 72.7754295 | 67.7703768 |
| 96 | 85.2546031 | 78.9894406 | 76.0952183 | 73.3475687 | 68.2584386 |
| 97 | 86.0395044 | 79.6575342 | 76.7116600 | 73.9163897 | 68.7428671 |
| 98 | 86.8224483 | 80.3228557 | 77.3250348 | 74.4819119 | 69.2236894 |
| 99 | 87.6034397 | 80.9854164 | 77.9353580 | 75.0441544 | 69.7009324 |
| 100 | 88.3824835 | 81.6452280 | 78.5426448 | 75.6031361 | 70.1746227 |

INTEREST TABLES (Continued)

PRESENT VALUE OF ANNUITY $[1 - (1 + i)^{-n}]/i$ (Continued)

| Years | Rate <i>i</i> | | | | |
|----------|---------------|--------------|-------------|------------|-------------|
| <i>n</i> | .01 (1%) | .01125 (1½%) | .0125 (1¼%) | .015 (1½%) | .0175 (1¾%) |
| 1 | 0.99009901 | 0.98887515 | 0.98765432 | 0.98522167 | 0.98280098 |
| 2 | 1.97039506 | 1.96674923 | 1.96311538 | 1.95588342 | 1.94869875 |
| 3 | 2.94098521 | 2.93374460 | 2.92653371 | 2.91220042 | 2.89798403 |
| 4 | 3.90196555 | 3.88998230 | 3.87805798 | 3.85438465 | 3.83094254 |
| 5 | 4.85343124 | 4.83558200 | 4.81783504 | 4.78264497 | 4.74785508 |
| 6 | 5.79547647 | 5.77066205 | 5.74600992 | 5.69718717 | 5.64899762 |
| 7 | 6.72819453 | 6.69533948 | 6.66272585 | 6.59821396 | 6.53464139 |
| 8 | 7.65167775 | 7.60973002 | 7.56812429 | 7.48592508 | 7.40505297 |
| 9 | 8.56601758 | 8.51394810 | 8.46234498 | 8.36051732 | 8.26049432 |
| 10 | 9.47130453 | 9.40810690 | 9.34552591 | 9.22218455 | 9.10122291 |
| 11 | 10.3676282 | 10.2923183 | 10.2178034 | 10.0711178 | 9.92749181 |
| 12 | 11.2550775 | 11.1666930 | 11.0793120 | 10.9075052 | 10.7395497 |
| 13 | 12.1337401 | 12.0313404 | 11.9301847 | 11.7315322 | 11.5376410 |
| 14 | 13.0037030 | 12.8863688 | 12.7705527 | 12.5433815 | 12.3220059 |
| 15 | 13.8650525 | 13.7318851 | 13.6005459 | 13.3432330 | 13.0928805 |
| 16 | 14.7178738 | 14.5679951 | 14.4202923 | 14.1312640 | 13.8504968 |
| 17 | 15.5622513 | 15.3948036 | 15.2299183 | 14.9076493 | 14.5950828 |
| 18 | 16.3982686 | 16.2124139 | 16.0295489 | 15.6725609 | 15.3268627 |
| 19 | 17.2260085 | 17.0209285 | 16.8193076 | 16.4261684 | 16.0460567 |
| 20 | 18.0455530 | 17.8204485 | 17.5993161 | 17.1686388 | 16.7528813 |
| 21 | 18.8569831 | 18.6110739 | 18.3696949 | 17.9001367 | 17.4475492 |
| 22 | 19.6603793 | 19.3929037 | 19.1305629 | 18.6208244 | 18.1302695 |
| 23 | 20.4558211 | 20.1660358 | 19.8820374 | 19.3308614 | 18.8012476 |
| 24 | 21.2433873 | 20.9305669 | 20.6242345 | 20.0304054 | 19.4606856 |
| 25 | 22.0231557 | 21.6865928 | 21.3572687 | 20.7196112 | 20.1087820 |
| 26 | 22.7952037 | 22.4342079 | 22.0812530 | 21.3986317 | 20.7457317 |
| 27 | 23.5596076 | 23.1735060 | 22.7962993 | 22.0676175 | 21.3717264 |
| 28 | 24.3164432 | 23.9045795 | 23.5025178 | 22.7267167 | 21.9869547 |
| 29 | 25.0657853 | 24.6275199 | 24.2000176 | 23.3760756 | 22.5916017 |
| 30 | 25.8077082 | 25.3424177 | 24.8889062 | 24.0158380 | 23.1858493 |
| 31 | 26.5422854 | 26.0493623 | 25.5692901 | 24.6461458 | 23.7698765 |
| 32 | 27.2695895 | 26.7484424 | 26.2412742 | 25.2671387 | 24.3438590 |
| 33 | 27.9896925 | 27.4397452 | 26.9049622 | 25.8789544 | 24.9079695 |
| 34 | 28.7026659 | 28.1233575 | 27.5604564 | 26.4817285 | 25.4623779 |
| 35 | 29.4085801 | 28.7993646 | 28.2078582 | 27.0755946 | 26.0072510 |
| 36 | 30.1075050 | 29.4678513 | 28.8472674 | 27.6606843 | 26.5427528 |
| 37 | 30.7995099 | 30.1289011 | 29.4787826 | 28.2371274 | 27.0690445 |
| 38 | 31.4846633 | 30.7825969 | 30.1025013 | 28.8050516 | 27.5862846 |
| 39 | 32.1630330 | 31.4290204 | 30.7185198 | 29.3645829 | 28.0946286 |
| 40 | 32.8346861 | 32.0682526 | 31.3269332 | 29.9158452 | 28.5942295 |
| 41 | 33.4996892 | 32.7003734 | 31.9278352 | 30.4589608 | 29.0852379 |
| 42 | 34.1581081 | 33.3254620 | 32.5213187 | 30.9940500 | 29.5678014 |
| 43 | 34.8100081 | 33.9435965 | 33.1074753 | 31.5212316 | 30.0420652 |
| 44 | 35.4554535 | 34.5548544 | 33.6863954 | 32.0406222 | 30.5081722 |
| 45 | 36.0945084 | 35.1593121 | 34.2581683 | 32.5523372 | 30.9662626 |
| 46 | 36.7272361 | 35.7570454 | 34.8228822 | 33.0564898 | 31.4164743 |
| 47 | 37.3536991 | 36.3481289 | 35.3806244 | 33.5531920 | 31.8589428 |
| 48 | 37.9739595 | 36.9326367 | 35.9314809 | 34.0425536 | 32.2938013 |
| 49 | 38.5880787 | 37.5106420 | 36.4755367 | 34.5246834 | 32.7211806 |
| 50 | 39.1961175 | 38.0822171 | 37.0128758 | 34.9996881 | 33.1412095 |

INTEREST TABLES (Continued)

PRESENT VALUE OF ANNUITY $[1 - (1 + i)^{-n}]/i$ (Continued)

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|---------------|-------------|------------|------------|------------|
| | .01(1%) | .01125(1½%) | .0125(1¾%) | .015(1½%) | .0175(1¾%) |
| 50 | 39.1961175 | 38.0822171 | 37.0128758 | 34.9996881 | 33.1412095 |
| 51 | 39.7981362 | 38.6474335 | 37.5435810 | 35.4676730 | 33.5540142 |
| 52 | 40.3941942 | 39.2063619 | 38.0677343 | 35.9287419 | 33.9597191 |
| 53 | 40.9843507 | 39.7590723 | 38.5854166 | 36.3829969 | 34.3584463 |
| 54 | 41.5686641 | 40.3056339 | 39.0967078 | 36.8305388 | 34.7503158 |
| 55 | 42.1471922 | 40.8461151 | 39.6016867 | 37.2714668 | 35.1354455 |
| 56 | 42.7199922 | 41.3805836 | 40.1004313 | 37.7058786 | 35.5139513 |
| 57 | 43.2871210 | 41.9091061 | 40.5930186 | 38.1338706 | 35.8859473 |
| 58 | 43.8486347 | 42.4317490 | 41.0795245 | 38.5555375 | 36.2515452 |
| 59 | 44.4045888 | 42.9485775 | 41.5600242 | 38.9709729 | 36.6108553 |
| 60 | 44.9550384 | 43.4596563 | 42.0345918 | 39.3802689 | 36.9639855 |
| 61 | 45.5000380 | 43.9650495 | 42.5033005 | 39.7835161 | 37.3110423 |
| 62 | 46.0396416 | 44.4648203 | 42.9662228 | 40.1808041 | 37.6521300 |
| 63 | 46.5739026 | 44.9590312 | 43.4234299 | 40.5722208 | 37.9873514 |
| 64 | 47.1028738 | 45.4477441 | 43.8749925 | 40.9578530 | 38.3168072 |
| 65 | 47.6266078 | 45.9310201 | 44.3209802 | 41.3377862 | 38.6405968 |
| 66 | 48.1451562 | 46.4089197 | 44.7614619 | 41.7121046 | 38.9588175 |
| 67 | 48.6585705 | 46.8815028 | 45.1965056 | 42.0808912 | 39.2715651 |
| 68 | 49.1669015 | 47.3488285 | 45.6261784 | 42.4442278 | 39.5789337 |
| 69 | 49.6701995 | 47.8109553 | 46.0505466 | 42.8021949 | 39.8810160 |
| 70 | 50.1685143 | 48.2679409 | 46.4696756 | 43.1548718 | 40.1779027 |
| 71 | 50.6618954 | 48.7198427 | 46.8836302 | 43.5023368 | 40.4696832 |
| 72 | 51.1503915 | 49.1667171 | 47.2924743 | 43.8446668 | 40.7564454 |
| 73 | 51.6340510 | 49.6086202 | 47.6962709 | 44.1819377 | 41.0382756 |
| 74 | 52.1129218 | 50.0456071 | 48.0950824 | 44.5142243 | 41.3152586 |
| 75 | 52.5870512 | 50.4777326 | 48.4889703 | 44.8416003 | 41.5874777 |
| 76 | 53.0564864 | 50.9050508 | 48.8779953 | 45.1641383 | 41.8550149 |
| 77 | 53.5212736 | 51.3276151 | 49.2622176 | 45.4819096 | 42.1179508 |
| 78 | 53.9814590 | 51.7454785 | 49.6416964 | 45.7949848 | 42.3763644 |
| 79 | 54.4370882 | 52.1586932 | 50.0164903 | 46.1034333 | 42.6303336 |
| 80 | 54.8882061 | 52.5673109 | 50.3866571 | 46.4073235 | 42.8799347 |
| 81 | 55.3348575 | 52.9713829 | 50.7522539 | 46.7067227 | 43.1252430 |
| 82 | 55.7770867 | 53.3709596 | 51.1133372 | 47.0016972 | 43.3663322 |
| 83 | 56.2149373 | 53.7660910 | 51.4699626 | 47.2923125 | 43.6032749 |
| 84 | 56.6484528 | 54.1568267 | 51.8221853 | 47.5786330 | 43.8361424 |
| 85 | 57.0776760 | 54.5432156 | 52.1700596 | 47.8607222 | 44.0650048 |
| 86 | 57.5026495 | 54.9253059 | 52.5136391 | 48.1386425 | 44.2899310 |
| 87 | 57.9234154 | 55.3031455 | 52.8529769 | 48.4124557 | 44.5109887 |
| 88 | 58.3400152 | 55.6767817 | 53.1881253 | 48.6822224 | 44.7282444 |
| 89 | 58.7524903 | 56.0462613 | 53.5191361 | 48.9480023 | 44.9417636 |
| 90 | 59.1608815 | 56.4116304 | 53.8460604 | 49.2098545 | 45.1516104 |
| 91 | 59.5652292 | 56.7729349 | 54.1689485 | 49.4678370 | 45.3578480 |
| 92 | 59.9655735 | 57.1302199 | 54.4878504 | 49.7220069 | 45.5605386 |
| 93 | 60.3619539 | 57.4835302 | 54.8028152 | 49.9724206 | 45.7597431 |
| 94 | 60.7544098 | 57.8329100 | 55.1138915 | 50.2191335 | 45.9555215 |
| 95 | 61.1429800 | 58.1784029 | 55.4211274 | 50.4622005 | 46.1479327 |
| 96 | 61.5277030 | 58.5200523 | 55.7245703 | 50.7016754 | 46.3370345 |
| 97 | 61.9086168 | 58.8579010 | 56.0242670 | 50.9376112 | 46.5228841 |
| 98 | 62.2857592 | 59.1919911 | 56.3202637 | 51.1700603 | 46.7055372 |
| 99 | 62.6591676 | 59.5223645 | 56.6126061 | 51.3990742 | 46.8850488 |
| 100 | 63.0288788 | 59.8490625 | 56.9013394 | 51.6247037 | 47.0614730 |

INTEREST TABLES (Continued)

PRESENT VALUE OF ANNUITY $[1 - (1 + i)^{-n}]/i$

(Continued)

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|---------------|-------------|------------|-------------|------------|
| | .02(2 %) | .0225(2½ %) | .025(2½ %) | .0275(2¾ %) | .03(3 %) |
| 1 | 0.98039216 | 0.97799511 | 0.97560976 | 0.97323601 | 0.97087379 |
| 2 | 1.94156094 | 1.93446955 | 1.92742415 | 1.92042434 | 1.91346970 |
| 3 | 2.88388327 | 2.86989687 | 2.85602356 | 2.84226213 | 2.82861135 |
| 4 | 3.80772870 | 3.78474021 | 3.76197421 | 3.73942787 | 3.71709840 |
| 5 | 4.71345951 | 4.67945253 | 4.64582850 | 4.61258186 | 4.57970719 |
| 6 | 5.60143089 | 5.55447680 | 5.50812536 | 5.46236678 | 5.41719144 |
| 7 | 6.47199107 | 6.41024626 | 6.34939060 | 6.28940806 | 6.23028296 |
| 8 | 7.32548144 | 7.24718461 | 7.17013717 | 7.09431441 | 7.01969219 |
| 9 | 8.16223671 | 8.06570622 | 7.97086553 | 7.87767826 | 7.78610892 |
| 10 | 8.98258501 | 8.86621635 | 8.75206393 | 8.64007616 | 8.53020284 |
| 11 | 9.78684805 | 9.64911134 | 9.51420871 | 9.38206926 | 9.25262411 |
| 12 | 10.5753412 | 10.4147788 | 10.2577646 | 10.1042037 | 9.95400399 |
| 13 | 11.3483737 | 11.1635979 | 10.9831850 | 10.8070109 | 10.6349553 |
| 14 | 12.1062488 | 11.8959392 | 11.6909122 | 11.4910081 | 11.2960731 |
| 15 | 12.8492635 | 12.6121655 | 12.3813777 | 12.1566989 | 11.9379351 |
| 16 | 13.5777093 | 13.3126313 | 13.0550027 | 12.8045732 | 12.5611020 |
| 17 | 14.2918719 | 13.9976834 | 13.7121977 | 13.4351077 | 13.1661185 |
| 18 | 14.9920313 | 14.6676611 | 14.3533636 | 14.0487666 | 13.7535131 |
| 19 | 15.6784620 | 15.3228959 | 14.9788913 | 14.6460016 | 14.3237991 |
| 20 | 16.3514333 | 15.9637124 | 15.5891623 | 15.2272521 | 14.8774749 |
| 21 | 17.0112092 | 16.5904277 | 16.1845486 | 15.7929461 | 15.4150241 |
| 22 | 17.6580482 | 17.2033523 | 16.7654132 | 16.3434999 | 15.9369166 |
| 23 | 18.2922041 | 17.8027896 | 17.3321105 | 16.8793186 | 16.4436084 |
| 24 | 18.9139256 | 18.3890362 | 17.8849858 | 17.4007967 | 16.9355421 |
| 25 | 19.5234565 | 18.9623826 | 18.4243764 | 17.9083180 | 17.4131477 |
| 26 | 20.1210358 | 19.5231126 | 18.9506111 | 18.4022559 | 17.8768424 |
| 27 | 20.7068978 | 20.0715038 | 19.4640109 | 18.8829741 | 18.3270315 |
| 28 | 21.2812724 | 20.6078276 | 19.9648887 | 19.3508264 | 18.7641082 |
| 29 | 21.8443847 | 21.1323498 | 20.4535499 | 19.8061571 | 19.1884546 |
| 30 | 22.3964556 | 21.6453298 | 20.9302926 | 20.2493013 | 19.6004413 |
| 31 | 22.9377015 | 22.1470219 | 21.3954074 | 20.6805852 | 20.0004285 |
| 32 | 23.4683348 | 22.6376742 | 21.8491780 | 21.1003262 | 20.3887655 |
| 33 | 23.9885636 | 23.1175298 | 22.2918809 | 21.5088333 | 20.7657918 |
| 34 | 24.4985917 | 23.5868262 | 22.7237863 | 21.9064071 | 21.1318367 |
| 35 | 24.9986193 | 24.0457958 | 23.1451573 | 22.2933403 | 21.4872201 |
| 36 | 25.4888425 | 24.4946658 | 23.5562511 | 22.6699175 | 21.8322525 |
| 37 | 25.9694534 | 24.9336585 | 23.9573181 | 23.0364161 | 22.1672354 |
| 38 | 26.4406406 | 25.3629912 | 24.3486030 | 23.3931057 | 22.4924616 |
| 39 | 26.9025888 | 25.7828765 | 24.7303444 | 23.7402488 | 22.8082151 |
| 40 | 27.3554792 | 26.1935222 | 25.1027751 | 24.0781011 | 23.1147720 |
| 41 | 27.7994895 | 26.5951317 | 25.4661220 | 24.4069110 | 23.4124000 |
| 42 | 28.2347936 | 26.9879039 | 25.8206068 | 24.7269207 | 23.7013592 |
| 43 | 28.6615623 | 27.3720332 | 26.1664457 | 25.0383656 | 23.9819021 |
| 44 | 29.0799631 | 27.7477097 | 26.5038495 | 25.3414751 | 24.2542739 |
| 45 | 29.4901599 | 28.1151195 | 26.8330239 | 25.6364721 | 24.5187125 |
| 46 | 29.8923136 | 28.4744445 | 27.1541696 | 25.9235738 | 24.7754491 |
| 47 | 30.2865820 | 28.8258626 | 27.4674826 | 26.2029915 | 25.0247078 |
| 48 | 30.6731196 | 29.1695478 | 27.7731537 | 26.4749309 | 25.2667066 |
| 49 | 31.0520780 | 29.5056702 | 28.0713695 | 26.7395922 | 25.5016569 |
| 50 | 31.4236059 | 29.8343963 | 28.3623117 | 26.9971700 | 25.7297640 |

INTEREST TABLES (Continued)

PRESENT VALUE OF ANNUITY $[1 - (1 + i)^{-n}]/i$ (Continued)

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|---------------|------------|------------|------------|------------|
| | .02(2%) | .0225(2½%) | .025(2½%) | .0275(2¾%) | .03(3%) |
| 50 | 31.4236059 | 29.8343963 | 28.3623117 | 26.9971700 | 25.7297640 |
| 51 | 31.7878489 | 30.1558888 | 28.6461577 | 27.2478540 | 25.9512272 |
| 52 | 32.1449499 | 30.4703069 | 28.9230807 | 27.4918287 | 26.1662400 |
| 53 | 32.4950489 | 30.7778062 | 29.1932495 | 27.7292737 | 26.3749903 |
| 54 | 32.8382833 | 31.0785391 | 29.4568288 | 27.9603637 | 26.5776605 |
| 55 | 33.1747875 | 31.3726544 | 29.7139793 | 28.1852688 | 26.7744276 |
| 56 | 33.5046936 | 31.6602977 | 29.9648578 | 28.4041545 | 26.9654637 |
| 57 | 33.8281310 | 31.9416114 | 30.2096174 | 28.6171820 | 27.1509357 |
| 58 | 34.1452265 | 32.2167349 | 30.4484072 | 28.8245081 | 27.3310055 |
| 59 | 34.4561044 | 32.4858043 | 30.6813729 | 29.0262852 | 27.5058306 |
| 60 | 34.7608867 | 32.7489529 | 30.9086565 | 29.2226620 | 27.6755637 |
| 61 | 35.0596928 | 33.0063109 | 31.1303966 | 29.4137830 | 27.8403531 |
| 62 | 35.3526400 | 33.2580057 | 31.3467284 | 29.5997888 | 28.0003428 |
| 63 | 35.6398432 | 33.5041621 | 31.5577838 | 29.7808163 | 28.1556726 |
| 64 | 35.9214149 | 33.7449018 | 31.7636915 | 29.9569989 | 28.3064783 |
| 65 | 36.1974655 | 33.9803440 | 31.9645771 | 30.1284661 | 28.4528915 |
| 66 | 36.4681035 | 34.2106054 | 32.1605630 | 30.2953441 | 28.5950403 |
| 67 | 36.7334348 | 34.4357999 | 32.3517688 | 30.4577558 | 28.7330488 |
| 68 | 36.9935635 | 34.6560391 | 32.5383110 | 30.6158207 | 28.8670377 |
| 69 | 37.2485917 | 34.8714318 | 32.7203034 | 30.7696552 | 28.9971240 |
| 70 | 37.4986193 | 35.0820849 | 32.8978570 | 30.9193725 | 29.1234214 |
| 71 | 37.7437444 | 35.2881026 | 33.0710800 | 31.0650827 | 29.2460401 |
| 72 | 37.9840631 | 35.4895869 | 33.2400780 | 31.2068931 | 29.3650875 |
| 73 | 38.2196697 | 35.6866376 | 33.4049542 | 31.3449082 | 29.4806675 |
| 74 | 38.4506566 | 35.8793521 | 33.5658089 | 31.4792294 | 29.5928811 |
| 75 | 38.6771143 | 36.0678261 | 33.7227404 | 31.6099556 | 29.7018263 |
| 76 | 38.8991317 | 36.2521526 | 33.8758443 | 31.7371830 | 29.8075983 |
| 77 | 39.1167958 | 36.4324231 | 34.0252140 | 31.8610054 | 29.9102896 |
| 78 | 39.3301919 | 36.6087267 | 34.1709405 | 31.9815138 | 30.0099899 |
| 79 | 39.5394039 | 36.7811509 | 34.3131127 | 32.0987969 | 30.1067863 |
| 80 | 39.7445136 | 36.9497808 | 34.4518172 | 32.2129410 | 30.2007634 |
| 81 | 39.9456016 | 37.1147000 | 34.5871388 | 32.3240301 | 30.2920033 |
| 82 | 40.1427466 | 37.2759903 | 34.7191598 | 32.4321461 | 30.3805858 |
| 83 | 40.3360261 | 37.4337313 | 34.8479607 | 32.5373685 | 30.4665881 |
| 84 | 40.5255158 | 37.5880013 | 34.9736202 | 32.6397747 | 30.5500856 |
| 85 | 40.7112900 | 37.7388765 | 35.0962149 | 32.7394401 | 30.6311510 |
| 86 | 40.8934216 | 37.8864318 | 35.2158194 | 32.8364380 | 30.7098554 |
| 87 | 41.0719819 | 38.0307402 | 35.3325067 | 32.9308399 | 30.7862673 |
| 88 | 41.2470411 | 38.1718730 | 35.4463480 | 33.0227153 | 30.8604537 |
| 89 | 41.4186677 | 38.3099003 | 35.5574127 | 33.1121317 | 30.9324794 |
| 90 | 41.5869292 | 38.4448902 | 35.6657685 | 33.1991549 | 31.0024071 |
| 91 | 41.7518913 | 38.5769098 | 35.7714814 | 33.2838490 | 31.0702982 |
| 92 | 41.9136190 | 38.7060242 | 35.8746160 | 33.3662764 | 31.1362118 |
| 93 | 42.0721754 | 38.8322975 | 35.9752352 | 33.4464978 | 31.2002057 |
| 94 | 42.2276230 | 38.9557922 | 36.0734002 | 33.5245720 | 31.2623356 |
| 95 | 42.3800225 | 39.0765694 | 36.1691709 | 33.6005567 | 31.3226559 |
| 96 | 42.5294339 | 39.1946889 | 36.2626057 | 33.6745078 | 31.3812193 |
| 97 | 42.6759155 | 39.3102092 | 36.3537617 | 33.7464796 | 31.4380770 |
| 98 | 42.8195250 | 39.4231875 | 36.4426943 | 33.8165251 | 31.4932787 |
| 99 | 42.9603187 | 39.5336797 | 36.5294579 | 33.8846960 | 31.5468725 |
| 100 | 43.0983516 | 39.6417405 | 36.6141053 | 33.9510423 | 31.5989053 |

INTEREST TABLES (Continued)

PRESENT VALUE OF ANNUITY $[1 - (1 + i)^{-n}]/i$ (Continued)

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|---------------|------------|------------|------------|------------|
| | .035(3½%) | .04(4%) | .045(4½%) | .05(5%) | .055(5½%) |
| 1 | 0.96618357 | 0.96153846 | 0.95693780 | 0.95238095 | 0.94786730 |
| 2 | 1.89969428 | 1.88609467 | 1.87266775 | 1.85941043 | 1.84631971 |
| 3 | 2.80163698 | 2.77509103 | 2.74896435 | 2.72324803 | 2.69793338 |
| 4 | 3.67307921 | 3.62989522 | 3.58752570 | 3.54595050 | 3.50515012 |
| 5 | 4.51505238 | 4.45182233 | 4.38997674 | 4.32947667 | 4.27028448 |
| 6 | 5.32855302 | 5.24213686 | 5.15787248 | 5.07569207 | 4.99553031 |
| 7 | 6.11454398 | 6.00205467 | 5.89270094 | 5.78637340 | 5.68296712 |
| 8 | 6.87395554 | 6.73274487 | 6.59588607 | 6.46321276 | 6.33456599 |
| 9 | 7.60768651 | 7.43533161 | 7.26879050 | 7.10782168 | 6.95219525 |
| 10 | 8.31660532 | 8.11089578 | 7.91271818 | 7.72173493 | 7.53762583 |
| 11 | 9.00155104 | 8.76047671 | 8.52891692 | 8.30641422 | 8.09253633 |
| 12 | 9.66333433 | 9.38507376 | 9.11858078 | 8.86325164 | 8.61851785 |
| 13 | 10.3027385 | 9.98564785 | 9.68285242 | 9.39357299 | 9.11707853 |
| 14 | 10.9205203 | 10.5631229 | 10.2228253 | 9.89864094 | 9.58964790 |
| 15 | 11.5174109 | 11.1183874 | 10.7395457 | 10.3796580 | 10.0375809 |
| 16 | 12.0941168 | 11.6522956 | 11.2340150 | 10.8377696 | 10.4621620 |
| 17 | 12.6513206 | 12.1656689 | 11.7071914 | 11.2740662 | 10.8646086 |
| 18 | 13.1896817 | 12.6592975 | 12.1599918 | 11.6895869 | 11.2460745 |
| 19 | 13.7098374 | 13.1339394 | 12.5932936 | 12.0853209 | 11.6076535 |
| 20 | 14.2124033 | 13.5903263 | 13.0079365 | 12.4622103 | 11.9503825 |
| 21 | 14.6979742 | 14.0291599 | 13.4047239 | 12.8211527 | 12.2752441 |
| 22 | 15.1671248 | 14.4511153 | 13.7844248 | 13.1630026 | 12.5831697 |
| 23 | 15.6204105 | 14.8568417 | 14.1477749 | 13.4885739 | 12.8750424 |
| 24 | 16.0583676 | 15.2469631 | 14.4954784 | 13.7986418 | 13.1516990 |
| 25 | 16.4815146 | 15.6220799 | 14.8282090 | 14.0939446 | 13.4139327 |
| 26 | 16.8903523 | 15.9827692 | 15.1466114 | 14.3751853 | 13.6624954 |
| 27 | 17.2853645 | 16.3295857 | 15.4513028 | 14.6430336 | 13.8980999 |
| 28 | 17.6670188 | 16.6630632 | 15.7428735 | 14.8981273 | 14.1214217 |
| 29 | 18.0357670 | 16.9837146 | 16.0218885 | 15.1410736 | 14.3331012 |
| 30 | 18.3920454 | 17.2920333 | 16.2888885 | 15.3724510 | 14.5337452 |
| 31 | 18.7362758 | 17.5884936 | 16.5443910 | 15.5928105 | 14.7239291 |
| 32 | 19.0688655 | 17.8735515 | 16.7888909 | 15.8026767 | 14.9041982 |
| 33 | 19.3902082 | 18.1476457 | 17.0228621 | 16.0025492 | 15.0750694 |
| 34 | 19.7006842 | 18.4111978 | 17.2467580 | 16.1929040 | 15.2370326 |
| 35 | 20.0006611 | 18.6646132 | 17.4610124 | 16.3741943 | 15.3905522 |
| 36 | 20.2904938 | 18.9082820 | 17.6660406 | 16.5468517 | 15.5360684 |
| 37 | 20.5705254 | 19.1425788 | 17.8622398 | 16.7112873 | 15.6739985 |
| 38 | 20.8410874 | 19.3678642 | 18.0499902 | 16.8678927 | 15.8047379 |
| 39 | 21.1024999 | 19.5844848 | 18.2296557 | 17.0170407 | 15.9286615 |
| 40 | 21.3550723 | 19.7927739 | 18.4015844 | 17.1590864 | 16.0461247 |
| 41 | 21.5991037 | 19.9930518 | 18.5661095 | 17.2943680 | 16.1574642 |
| 42 | 21.8348828 | 20.1856267 | 18.7235498 | 17.4232076 | 16.2629992 |
| 43 | 22.0626887 | 20.3707949 | 18.8742103 | 17.5459120 | 16.3630324 |
| 44 | 22.2827910 | 20.5488413 | 19.0183831 | 17.6627733 | 16.4578506 |
| 45 | 22.4954503 | 20.7200397 | 19.1563474 | 17.7740698 | 16.5477257 |
| 46 | 22.7009181 | 20.8846536 | 19.2883707 | 17.8800665 | 16.6329154 |
| 47 | 22.8994378 | 21.0429361 | 19.4147088 | 17.9810157 | 16.7136639 |
| 48 | 23.0912443 | 21.1951309 | 19.5356065 | 18.0771578 | 16.7902024 |
| 49 | 23.2765645 | 21.3414720 | 19.6512981 | 18.1687217 | 16.8627514 |
| 50 | 23.4556179 | 21.4821846 | 19.7620078 | 18.2559255 | 16.9315179 |

INTEREST TABLES (Continued)

PRESENT VALUE OF ANNUITY $[1 - (1 + i)^{-n}]/i$ (Continued)

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|---------------|------------|------------|------------|------------|
| | .06(6 %) | .065(6½ %) | .07(7 %) | .075(7½ %) | .08(8 %) |
| 1 | 0.94339623 | 0.93896714 | 0.93457944 | 0.93023256 | 0.92592593 |
| 2 | 1.83339267 | 1.82062642 | 1.80801817 | 1.79556517 | 1.78326475 |
| 3 | 2.67301195 | 2.64847551 | 2.62431604 | 2.60052574 | 2.57709699 |
| 4 | 3.46510561 | 3.42579860 | 3.38721126 | 3.34932627 | 3.31212684 |
| 5 | 4.21236379 | 4.15567944 | 4.10019744 | 4.04588490 | 3.99271004 |
| 6 | 4.91732433 | 4.84101356 | 4.76653966 | 4.69384642 | 4.62287966 |
| 7 | 5.58238144 | 5.48451977 | 5.38928940 | 5.29660132 | 5.20637006 |
| 8 | 6.20979381 | 6.08875096 | 5.97129851 | 5.85730355 | 5.74663894 |
| 9 | 6.80169227 | 6.65610419 | 6.51523225 | 6.37888703 | 6.24688791 |
| 10 | 7.36008705 | 7.18883022 | 7.02358154 | 6.86408096 | 6.71008140 |
| 11 | 7.88687458 | 7.68904246 | 7.49867434 | 7.31542415 | 7.13896426 |
| 12 | 8.38384394 | 8.15872532 | 7.94268630 | 7.73527827 | 7.53607802 |
| 13 | 8.85268296 | 8.59974208 | 8.35765074 | 8.12584026 | 7.90377594 |
| 14 | 9.29498393 | 9.01384233 | 8.74546799 | 8.48915373 | 8.24423698 |
| 15 | 9.71224899 | 9.40266885 | 9.10791401 | 8.82711975 | 8.55947869 |
| 16 | 10.1058953 | 9.76776418 | 9.44664860 | 9.14150674 | 8.85136916 |
| 17 | 10.4772597 | 10.1105767 | 9.76322299 | 9.43395976 | 9.12163811 |
| 18 | 10.8276035 | 10.4324664 | 10.0590869 | 9.70600908 | 9.37188714 |
| 19 | 11.1581165 | 10.7347102 | 10.3355952 | 9.95907821 | 9.60359920 |
| 20 | 11.4699212 | 11.0185072 | 10.5940142 | 10.1944914 | 9.81814741 |
| 21 | 11.7640766 | 11.2849833 | 10.8355273 | 10.4134803 | 10.0168032 |
| 22 | 12.0415817 | 11.5351956 | 11.0612405 | 10.6171910 | 10.2007437 |
| 23 | 12.3033790 | 11.7701367 | 11.2721874 | 10.8066893 | 10.3710589 |
| 24 | 12.5503575 | 11.9907387 | 11.4693340 | 10.9829668 | 10.5287583 |
| 25 | 12.7833562 | 12.1978767 | 11.6535832 | 11.1469459 | 10.6747762 |
| 26 | 13.0031662 | 12.3923725 | 11.8257787 | 11.2994845 | 10.8099780 |
| 27 | 13.2105341 | 12.5749977 | 11.9867090 | 11.4413810 | 10.9351648 |
| 28 | 13.4061643 | 12.7464767 | 12.1371113 | 11.5733776 | 11.0510785 |
| 29 | 13.5907210 | 12.9074898 | 12.2776741 | 11.6961652 | 11.1584060 |
| 30 | 13.7648312 | 13.0586759 | 12.4090412 | 11.8103863 | 11.2577833 |
| 31 | 13.9290860 | 13.2006347 | 12.5318142 | 11.9166384 | 11.3497994 |
| 32 | 14.0840434 | 13.3339293 | 12.6465553 | 12.0154776 | 11.4349994 |
| 33 | 14.2302296 | 13.4590885 | 12.7537900 | 12.1074210 | 11.5138884 |
| 34 | 14.3681411 | 13.5766089 | 12.8540094 | 12.1929498 | 11.5869337 |
| 35 | 14.4982464 | 13.6869567 | 12.9476723 | 12.2725114 | 11.6545682 |
| 36 | 14.6209871 | 13.7905697 | 13.0352078 | 12.3465222 | 11.7171928 |
| 37 | 14.7367803 | 13.8878589 | 13.1170166 | 12.4153695 | 11.7751785 |
| 38 | 14.8460192 | 13.9792102 | 13.1934735 | 12.4794135 | 11.8288690 |
| 39 | 14.9490747 | 14.0649861 | 13.2649285 | 12.5389893 | 11.8785824 |
| 40 | 15.0462969 | 14.1455269 | 13.3317088 | 12.5944087 | 11.9246133 |
| 41 | 15.1380159 | 14.2211520 | 13.3941204 | 12.6459615 | 11.9672346 |
| 42 | 15.2245433 | 14.2921615 | 13.4524490 | 12.6939177 | 12.0066987 |
| 43 | 15.3061729 | 14.3588371 | 13.5069617 | 12.7385281 | 12.0432395 |
| 44 | 15.3831820 | 14.4214433 | 13.5579081 | 12.7800261 | 12.0770736 |
| 45 | 15.4558321 | 14.4802284 | 13.6055216 | 12.8186290 | 12.1084015 |
| 46 | 15.5243699 | 14.5354257 | 13.6500202 | 12.8545386 | 12.1374088 |
| 47 | 15.5890282 | 14.5872542 | 13.6916076 | 12.8879429 | 12.1642674 |
| 48 | 15.6500266 | 14.6359195 | 13.7304744 | 12.9190166 | 12.1891365 |
| 49 | 15.7075723 | 14.6816145 | 13.7667985 | 12.9479224 | 12.2121634 |
| 50 | 15.7618606 | 14.7245207 | 13.8007463 | 12.9748116 | 12.2334846 |

INTEREST TABLES (Continued)

ANNUITY WHOSE PRESENT VALUE IS 1

$$\frac{1}{a_n} = \frac{i^{-1}}{a_n} = \frac{i}{1 - (1 + i)^{-n}} = \frac{i}{1 - v^n} = s_n^{-1} + i$$

| Years | Rate <i>i</i> | | | | |
|-------|-------------------------|---------------------------|------------------------|----------------------------|--------------------------|
| | .0025($\frac{1}{4}$ %) | .004167($\frac{1}{2}$ %) | .005($\frac{3}{4}$ %) | .005833($1\frac{1}{4}$ %) | .0075($1\frac{3}{4}$ %) |
| 1 | 1.00250000 | 1.00416667 | 1.00500000 | 1.00583333 | 1.00750000 |
| 2 | 0.50187578 | 0.50312717 | 0.50375312 | 0.50437924 | 0.50563200 |
| 3 | .33500139 | .33611496 | .33667221 | .33722976 | .33834579 |
| 4 | .25156445 | .25260958 | .25313279 | .25365644 | .25470501 |
| 5 | .20150250 | .20250693 | .20300997 | .20351357 | .20452242 |
| 6 | .16812803 | .16910564 | .16959546 | .17008594 | .17106891 |
| 7 | .14428928 | .14524800 | .14572854 | .14620986 | .14717488 |
| 8 | .12641035 | .12735512 | .12782886 | .12830352 | .12925552 |
| 9 | .11250462 | .11343876 | .11390736 | .11437698 | .11531929 |
| 10 | .10138015 | .10230596 | .10277057 | .10323632 | .10417123 |
| 11 | .09227840 | .09319757 | .09365903 | .09412175 | .09505094 |
| 12 | .08469370 | .08560748 | .08606643 | .08652675 | .08745148 |
| 13 | .07827595 | .07918532 | .07964224 | .08010064 | .08102188 |
| 14 | .07277510 | .07368082 | .07413609 | .07459295 | .07551146 |
| 15 | .06800777 | .06891045 | .06936436 | .06982000 | .07073639 |
| 16 | .06383642 | .06473655 | .06518937 | .06564401 | .06655879 |
| 17 | .06015587 | .06105387 | .06150579 | .06195966 | .06287321 |
| 18 | .05688433 | .05778053 | .05823173 | .05868499 | .05959766 |
| 19 | .05395722 | .05485191 | .05530253 | .05575532 | .05666740 |
| 20 | .05132288 | .05221630 | .05266645 | .05311889 | .05403063 |
| 21 | .04893947 | .04983183 | .05028163 | .05073383 | .05164543 |
| 22 | .04677278 | .04766427 | .04811380 | .04856585 | .04947748 |
| 23 | .04479455 | .04568531 | .04613465 | .04658663 | .04749846 |
| 24 | .04298121 | .04387139 | .04432061 | .04477258 | .04568474 |
| 25 | .04131298 | .04220270 | .04265186 | .04310388 | .04401650 |
| 26 | .03977312 | .04066247 | .04111163 | .04156376 | .04247693 |
| 27 | .03834736 | .03923645 | .03968565 | .04013793 | .04105176 |
| 28 | .03702347 | .03791239 | .03836167 | .03881415 | .03972871 |
| 29 | .03579093 | .03667974 | .03712914 | .03758186 | .03849723 |
| 30 | .03464059 | .03552936 | .03597892 | .03643191 | .03734816 |
| 31 | .03356449 | .03445330 | .03490304 | .03535633 | .03627352 |
| 32 | .03255569 | .03344458 | .03389453 | .03434815 | .03526634 |
| 33 | .03160806 | .03249708 | .03294727 | .03340124 | .03432048 |
| 34 | .03071620 | .03160540 | .03205586 | .03251020 | .03343053 |
| 35 | .02987533 | .03076476 | .03121550 | .03167024 | .03259170 |
| 36 | .02908121 | .02997090 | .03042194 | .03087710 | .03179973 |
| 37 | .02833004 | .02922003 | .02967139 | .03012698 | .03105082 |
| 38 | .02761843 | .02850875 | .02896045 | .02941649 | .03034157 |
| 39 | .02694335 | .02783402 | .02828607 | .02874258 | .02966893 |
| 40 | .02630204 | .02719310 | .02764552 | .02810251 | .02903016 |
| 41 | .02569204 | .02658352 | .02703631 | .02749379 | .02842276 |
| 42 | .02511112 | .02600303 | .02645622 | .02691420 | .02784452 |
| 43 | .02455724 | .02544961 | .02590320 | .02636170 | .02729338 |
| 44 | .02402855 | .02492141 | .02537541 | .02583443 | .02676751 |
| 45 | .02352339 | .02441675 | .02487117 | .02533073 | .02626521 |
| 46 | .02304022 | .02393409 | .02438894 | .02484905 | .02578495 |
| 47 | .02257762 | .02347204 | .02392733 | .02438798 | .02532532 |
| 48 | .02213433 | .02302929 | .02348503 | .02394624 | .02488504 |
| 49 | .02170915 | .02260468 | .02306087 | .02352265 | .02446292 |
| 50 | .02130099 | .02219711 | .02265376 | .02311612 | .02405787 |

INTEREST TABLES (Continued)

ANNUITY WHOSE PRESENT VALUE IS 1

$$a_{\overline{n}|}^{-1} = i/(1 - v^n) = s_{\overline{n}|}^{-1} + i \text{ (Continued)}$$

| Years | Rate i | | | | |
|-------|--------------------------|-----------------------------|-------------------------|-----------------------------|--------------------------|
| n | .0025($\frac{1}{4}\%$) | .004167($\frac{5}{12}\%$) | .005($\frac{1}{2}\%$) | .005833($\frac{7}{12}\%$) | .0075($\frac{3}{4}\%$) |
| 50 | .02130099 | .02219711 | .02265376 | .02311612 | .02405787 |
| 51 | .02090886 | .02180557 | .02226269 | .02272563 | .02366888 |
| 52 | .02053184 | .02142916 | .02188675 | .02235027 | .02329503 |
| 53 | .02016906 | .02106700 | .02152507 | .02198919 | .02293546 |
| 54 | .01981974 | .02071830 | .02117686 | .02164157 | .02258938 |
| 55 | .01948314 | .02038234 | .02084139 | .02130671 | .02225605 |
| 56 | .01915858 | .02005843 | .02051797 | .02098390 | .02193478 |
| 57 | .01884542 | .01974593 | .02020598 | .02067251 | .02162496 |
| 58 | .01854308 | .01944426 | .01990481 | .02037196 | .02132597 |
| 59 | .01825101 | .01915287 | .01961392 | .02008170 | .02103727 |
| 60 | .01796869 | .01887123 | .01933280 | .01980120 | .02075836 |
| 61 | .01769564 | .01859888 | .01906096 | .01952999 | .02048873 |
| 62 | .01743142 | .01833536 | .01879796 | .01926762 | .02022795 |
| 63 | .01717561 | .01808025 | .01854337 | .01901366 | .01997560 |
| 64 | .01692780 | .01783315 | .01829681 | .01876773 | .01973127 |
| 65 | .01668764 | .01759371 | .01805789 | .01852946 | .01949460 |
| 66 | .01645476 | .01736156 | .01782627 | .01829848 | .01926524 |
| 67 | .01622886 | .01713639 | .01760163 | .01807449 | .01904286 |
| 68 | .01600961 | .01691788 | .01738366 | .01785716 | .01882716 |
| 69 | .01579674 | .01670574 | .01717206 | .01764622 | .01861785 |
| 70 | .01558996 | .01649971 | .01696657 | .01744138 | .01841464 |
| 71 | .01538902 | .01629952 | .01676633 | .01724239 | .01821728 |
| 72 | .01519368 | .01610493 | .01657289 | .01704901 | .01802554 |
| 73 | .01500370 | .01591572 | .01638422 | .01686100 | .01783917 |
| 74 | .01481887 | .01573165 | .01620070 | .01667814 | .01765796 |
| 75 | .01463898 | .01555253 | .01602214 | .01650024 | .01748170 |
| 76 | .01446385 | .01537816 | .01584832 | .01632709 | .01731020 |
| 77 | .01429327 | .01520836 | .01567908 | .01615851 | .01714328 |
| 78 | .01412708 | .01504295 | .01551423 | .01599432 | .01698074 |
| 79 | .01396511 | .01488177 | .01535360 | .01583436 | .01682244 |
| 80 | .01380721 | .01472464 | .01519704 | .01567847 | .01666821 |
| 81 | .01365321 | .01457144 | .01504439 | .01552650 | .01651790 |
| 82 | .01350298 | .01442200 | .01489552 | .01537830 | .01637136 |
| 83 | .01335639 | .01427620 | .01475028 | .01523373 | .01622847 |
| 84 | .01321330 | .01413391 | .01460855 | .01509268 | .01608908 |
| 85 | .01307359 | .01399500 | .01447021 | .01495501 | .01595308 |
| 86 | .01293714 | .01385935 | .01433513 | .01482060 | .01582034 |
| 87 | .01280384 | .01372685 | .01420320 | .01468935 | .01569076 |
| 88 | .01267357 | .01359740 | .01407431 | .01456115 | .01556423 |
| 89 | .01254625 | .01347088 | .01394837 | .01443588 | .01544064 |
| 90 | .01242177 | .01334721 | .01382527 | .01431347 | .01531989 |
| 91 | .01230004 | .01322629 | .01370493 | .01419380 | .01520190 |
| 92 | .01218096 | .01310803 | .01358724 | .01407679 | .01508657 |
| 93 | .01206446 | .01299234 | .01347213 | .01396236 | .01497382 |
| 94 | .01195044 | .01287915 | .01335950 | .01385042 | .01486356 |
| 95 | .01183884 | .01276836 | .01324930 | .01374090 | .01475571 |
| 96 | .01172957 | .01265992 | .01314143 | .01363372 | .01465020 |
| 97 | .01162257 | .01255374 | .01303583 | .01352880 | .01454696 |
| 98 | .01151776 | .01244976 | .01293242 | .01342608 | .01444592 |
| 99 | .01141508 | .01234790 | .01283115 | .01332549 | .01434701 |
| 100 | .01131446 | .01224811 | .01273194 | .01322696 | .01425017 |

INTEREST TABLES (Continued)

ANNUITY WHOSE PRESENT VALUE IS 1

$$a_{\overline{n}|}^{-1} = i/(1 - v^n) = s_{\overline{n}|}^{-1} + i \text{ (Continued)}$$

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|---------------|--------------|-------------|------------|-------------|
| | .01 (1%) | .01125 (1½%) | .0125 (1¼%) | .015 (1½%) | .0175 (1¾%) |
| 1 | 1.01000000 | 1.01125000 | 1.01250000 | 1.01500000 | 1.01750000 |
| 2 | 0.50751244 | 0.50845323 | 0.50939441 | 0.51127792 | 0.51316295 |
| 3 | .34002211 | .34086130 | .34170117 | .34338296 | .34506746 |
| 4 | .25628109 | .25707058 | .25786102 | .25944479 | .26103237 |
| 5 | .20603980 | .20680034 | .20756211 | .20908932 | .21062142 |
| 6 | .17254837 | .17329034 | .17403381 | .17552521 | .17702256 |
| 7 | .14862828 | .14935762 | .15008872 | .15155616 | .15303059 |
| 8 | .13069029 | .13141071 | .13213314 | .13358402 | .13504292 |
| 9 | .11674036 | .11745432 | .11817055 | .11960982 | .12105813 |
| 10 | .10558208 | .10629131 | .10700307 | .10843418 | .10987534 |
| 11 | .09645408 | .09715984 | .09786839 | .09929384 | .10073038 |
| 12 | .08884879 | .08955203 | .09025831 | .09167999 | .09311377 |
| 13 | .08241482 | .08311626 | .08382100 | .08524036 | .08667283 |
| 14 | .07690117 | .07760138 | .07830515 | .07972332 | .08115562 |
| 15 | .07212378 | .07282321 | .07352646 | .07494436 | .07637739 |
| 16 | .06794460 | .06864363 | .06934672 | .07076508 | .07219958 |
| 17 | .06425806 | .06495698 | .06566023 | .06707966 | .06851623 |
| 18 | .06098205 | .06168113 | .06238479 | .06380578 | .06524492 |
| 19 | .05805175 | .05875120 | .05945548 | .06087847 | .06232061 |
| 20 | .05541531 | .05611531 | .05682039 | .05824574 | .05969122 |
| 21 | .05303075 | .05373145 | .05443749 | .05586650 | .05731464 |
| 22 | .05086372 | .05156525 | .05227238 | .05370332 | .05515638 |
| 23 | .04888584 | .04958833 | .05029666 | .05173075 | .05318796 |
| 24 | .04707347 | .04777701 | .04848665 | .04992410 | .05138565 |
| 25 | .04540675 | .04611144 | .04682247 | .04826345 | .04972952 |
| 26 | .04386888 | .04457479 | .04528729 | .04673196 | .04820269 |
| 27 | .04244553 | .04315273 | .04386677 | .04531527 | .04679079 |
| 28 | .04112444 | .04183299 | .04254863 | .04400108 | .04548151 |
| 29 | .03989502 | .04060498 | .04132228 | .04277878 | .04426424 |
| 30 | .03874811 | .03945953 | .04017854 | .04163919 | .04312975 |
| 31 | .03767573 | .03838866 | .03910942 | .04057430 | .04207005 |
| 32 | .03667089 | .03738535 | .03810791 | .03957710 | .04107812 |
| 33 | .03572744 | .03644349 | .03716786 | .03864144 | .04014779 |
| 34 | .03483997 | .03555763 | .03628387 | .03776189 | .03927363 |
| 35 | .03400368 | .03472299 | .03545111 | .03693363 | .03845082 |
| 36 | .03321431 | .03393529 | .03466533 | .03615240 | .03767507 |
| 37 | .03246805 | .03319072 | .03392270 | .03541437 | .03694257 |
| 38 | .03176150 | .03248589 | .03321983 | .03471613 | .03624990 |
| 39 | .03109160 | .03181773 | .03255365 | .03405463 | .03559399 |
| 40 | .03045560 | .03118349 | .03192141 | .03342710 | .03497209 |
| 41 | .02985102 | .03058069 | .03132063 | .03283106 | .03438170 |
| 42 | .02927563 | .03000709 | .03074906 | .03226426 | .03382057 |
| 43 | .02872737 | .02946064 | .03020466 | .03172465 | .03328666 |
| 44 | .02820441 | .02893949 | .02968557 | .03121038 | .03277810 |
| 45 | .02770505 | .02844197 | .02919012 | .03071976 | .03229321 |
| 46 | .02722775 | .02796652 | .02871675 | .03025125 | .03183043 |
| 47 | .02677111 | .02751173 | .02826406 | .02980342 | .03138836 |
| 48 | .02633384 | .02707632 | .02783075 | .02937500 | .03096569 |
| 49 | .02591474 | .02665910 | .02741563 | .02896478 | .03056124 |
| 50 | .02551273 | .02625898 | .02701763 | .02857168 | .03017391 |

INTEREST TABLES (Continued)

ANNUITY WHOSE PRESENT VALUE IS 1

$$a_n^{-1} = i/(1 - v^n) = s_n^{-1} + i \text{ (Continued)}$$

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|---------------|--------------|-------------|------------|-------------|
| | .01(1 %) | .01125(1½ %) | .0125(1½ %) | .015(1½ %) | .0175(1½ %) |
| 50 | .02551273 | .02625898 | .02701763 | .02857168 | .03017391 |
| 51 | .02512680 | .02587494 | .02663571 | .02819469 | .02980269 |
| 52 | .02475603 | .02550606 | .02626897 | .02783287 | .02944665 |
| 53 | .02439956 | .02515149 | .02591653 | .02748537 | .02910492 |
| 54 | .02405658 | .02481043 | .02557760 | .02715138 | .02877672 |
| 55 | .02372637 | .02448213 | .02525145 | .02683018 | .02846129 |
| 56 | .02340824 | .02416592 | .02493739 | .02652106 | .02815795 |
| 57 | .02310156 | .02386116 | .02463478 | .02622341 | .02786606 |
| 58 | .02280573 | .02356726 | .02434303 | .02593661 | .02758503 |
| 59 | .02252020 | .02328366 | .02406158 | .02566012 | .02731430 |
| 60 | .02224445 | .02300985 | .02378993 | .02539343 | .02705336 |
| 61 | .02197800 | .02274534 | .02352758 | .02513604 | .02680172 |
| 62 | .02172041 | .02248969 | .02327410 | .02488751 | .02655892 |
| 63 | .02147125 | .02224247 | .02302904 | .02464741 | .02632455 |
| 64 | .02123013 | .02200329 | .02279203 | .02441534 | .02609821 |
| 65 | .02099667 | .02177178 | .02256268 | .02419094 | .02587952 |
| 66 | .02077052 | .02154758 | .02234065 | .02397386 | .02566813 |
| 67 | .02055136 | .02133037 | .02212560 | .02376376 | .02546372 |
| 68 | .02033889 | .02111985 | .02191724 | .02356033 | .02526597 |
| 69 | .02013280 | .02091571 | .02171527 | .02336329 | .02507459 |
| 70 | .01993282 | .02071769 | .02151941 | .02317235 | .02488930 |
| 71 | .01973870 | .02052552 | .02132941 | .02298727 | .02470985 |
| 72 | .01955019 | .02033896 | .02114501 | .02280779 | .02453600 |
| 73 | .01936706 | .02015779 | .02096600 | .02263368 | .02436750 |
| 74 | .01918910 | .01998177 | .02079215 | .02246473 | .02420413 |
| 75 | .01901609 | .01981072 | .02062325 | .02230072 | .02404570 |
| 76 | .01884784 | .01964442 | .02045910 | .02214146 | .02389200 |
| 77 | .01868416 | .01948269 | .02029953 | .02198676 | .02374285 |
| 78 | .01852488 | .01932536 | .02014436 | .02183645 | .02359806 |
| 79 | .01836983 | .01917226 | .01999341 | .02169036 | .02345748 |
| 80 | .01821885 | .01902323 | .01984652 | .02154832 | .02332093 |
| 81 | .01807179 | .01887812 | .01970356 | .02141019 | .02318828 |
| 82 | .01792851 | .01873678 | .01956437 | .02127583 | .02305936 |
| 83 | .01778887 | .01859908 | .01942881 | .02114509 | .02293406 |
| 84 | .01765273 | .01846489 | .01929675 | .02101784 | .02281223 |
| 85 | .01751998 | .01833409 | .01916808 | .02089396 | .02269375 |
| 86 | .01739050 | .01820654 | .01904267 | .02077333 | .02257850 |
| 87 | .01726418 | .01808215 | .01892041 | .02065584 | .02246636 |
| 88 | .01714089 | .01796081 | .01880119 | .02054138 | .02235724 |
| 89 | .01702056 | .01784240 | .01868491 | .02042984 | .02225102 |
| 90 | .01690306 | .01772684 | .01857146 | .02032113 | .02214760 |
| 91 | .01678832 | .01761403 | .01846076 | .02021516 | .02204690 |
| 92 | .01667624 | .01750387 | .01835272 | .02011182 | .02194882 |
| 93 | .01656673 | .01739629 | .01824724 | .02001104 | .02185327 |
| 94 | .01645971 | .01729119 | .01814425 | .01991273 | .02176017 |
| 95 | .01635511 | .01718851 | .01804366 | .01981681 | .02166944 |
| 96 | .01625284 | .01708816 | .01794541 | .01972321 | .02158101 |
| 97 | .01615284 | .01699007 | .01784941 | .01963186 | .02149480 |
| 98 | .01605503 | .01689418 | .01775560 | .01954268 | .02141074 |
| 99 | .01595936 | .01680041 | .01766391 | .01945560 | .02132876 |
| 100 | .01586574 | .01670870 | .01757428 | .01937057 | .02124880 |

INTEREST TABLES (Continued)

ANNUITY WHOSE PRESENT VALUE IS 1

$$a_n^{-1} = i/(1 - v^n) = s_n^{-1} + i \text{ (Continued)}$$

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|---------------|------------|------------|------------|------------|
| | .02(2%) | .0225(2½%) | .025(2½%) | .0275(2½%) | .03(3%) |
| 1 | 1.02000000 | 1.02250000 | 1.02500000 | 1.02750000 | 1.03000000 |
| 2 | 0.51504950 | 0.51693758 | 0.51882716 | 0.52071825 | 0.52261084 |
| 3 | .34675467 | .34844458 | .35013717 | .35183243 | .35353036 |
| 4 | .26262375 | .26421893 | .26581788 | .26742059 | .26902705 |
| 5 | .21215839 | .21370021 | .21524686 | .21679832 | .21835457 |
| 6 | .17852581 | .18003496 | .18154997 | .18307083 | .18459750 |
| 7 | .15451196 | .15600025 | .15749543 | .15899747 | .16050635 |
| 8 | .13650980 | .13798462 | .13946735 | .14095795 | .14245639 |
| 9 | .12251544 | .12398170 | .12545689 | .12694095 | .12843386 |
| 10 | .11132653 | .11278768 | .11425876 | .11573972 | .11723051 |
| 11 | .10217794 | .10363649 | .10510596 | .10658629 | .10807745 |
| 12 | .09455960 | .09601740 | .09748713 | .09896871 | .10046209 |
| 13 | .08811835 | .08957686 | .09104827 | .09253252 | .09402954 |
| 14 | .08260197 | .08406230 | .08553652 | .08702457 | .08852634 |
| 15 | .07782547 | .07928852 | .08076646 | .08225917 | .08376658 |
| 16 | .07365013 | .07511663 | .07659899 | .07809710 | .07961085 |
| 17 | .06996984 | .07144039 | .07292777 | .07443186 | .07595253 |
| 18 | .06670210 | .06817720 | .06967008 | .07118063 | .07270870 |
| 19 | .06378177 | .06526182 | .06676062 | .06827802 | .06981388 |
| 20 | .06115672 | .06264207 | .06414713 | .06567173 | .06721571 |
| 21 | .05878477 | .06027572 | .06178733 | .06331941 | .06487178 |
| 22 | .05663140 | .05812821 | .05964661 | .06118640 | .06274739 |
| 23 | .05466810 | .05617097 | .05769638 | .05924410 | .06081390 |
| 24 | .05287110 | .05438023 | .05591282 | .05746863 | .05904742 |
| 25 | .05122044 | .05273599 | .05427592 | .05583997 | .05742787 |
| 26 | .04969923 | .05122134 | .05276875 | .05434116 | .05593829 |
| 27 | .04829309 | .04982188 | .05137687 | .05295776 | .05456421 |
| 28 | .04698967 | .04852525 | .05008793 | .05167738 | .05329323 |
| 29 | .04577836 | .04732081 | .04889127 | .05048935 | .05211467 |
| 30 | .04464992 | .04619934 | .04777764 | .04938442 | .05101926 |
| 31 | .04359635 | .04515280 | .04673900 | .04835453 | .04999893 |
| 32 | .04261061 | .04417415 | .04576831 | .04739263 | .04904662 |
| 33 | .04168653 | .04325722 | .04485938 | .04649253 | .04815612 |
| 34 | .04081867 | .04239655 | .04400675 | .04564875 | .04732196 |
| 35 | .04000221 | .04158731 | .04320558 | .04485645 | .04653929 |
| 36 | .03923285 | .04082522 | .04245158 | .04411132 | .04580379 |
| 37 | .03850678 | .04010643 | .04174090 | .04340953 | .04511162 |
| 38 | .03782057 | .03942753 | .04107012 | .04274764 | .04445934 |
| 39 | .03717114 | .03878543 | .04043615 | .04212256 | .04384385 |
| 40 | .03655575 | .03817738 | .03983623 | .04153151 | .04326238 |
| 41 | .03597188 | .03760087 | .03926786 | .04097200 | .04271241 |
| 42 | .03541729 | .03705364 | .03872876 | .04044175 | .04219167 |
| 43 | .03488993 | .03653364 | .03821688 | .03993871 | .04169811 |
| 44 | .03438794 | .03603901 | .03773037 | .03946100 | .04122985 |
| 45 | .03390962 | .03556805 | .03726751 | .03900693 | .04078518 |
| 46 | .03345342 | .03511921 | .03682676 | .03857493 | .04036254 |
| 47 | .03301792 | .03469107 | .03640669 | .03816358 | .03996051 |
| 48 | .03260184 | .03428233 | .03600599 | .03777158 | .03957777 |
| 49 | .03220396 | .03389179 | .03562348 | .03739773 | .03921314 |
| 50 | .03182321 | .03351836 | .03525806 | .03704092 | .03886549 |

INTEREST TABLES (Continued)

ANNUITY WHOSE PRESENT VALUE IS 1

$$a_{\overline{n}|}^{-1} = i/(1 - v^n) = s_{\overline{n}|}^{-1} + i \text{ (Continued)}$$

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|---------------|-------------|------------|-------------|-----------|
| | .02 (2%) | .0225 (2½%) | .025 (2½%) | .0275 (2¾%) | .03 (3%) |
| 50 | .03182321 | .03351836 | .03525806 | .03704092 | .03886549 |
| 51 | .03145856 | .03316102 | .03490870 | .03670014 | .03853382 |
| 52 | .03110909 | .03281884 | .03457446 | .03637444 | .03821718 |
| 53 | .03077392 | .03249094 | .03425449 | .03606297 | .03791471 |
| 54 | .03045226 | .03217654 | .03394799 | .03576491 | .03762558 |
| 55 | .03014337 | .03187489 | .03365419 | .03547953 | .03734907 |
| 56 | .02984656 | .03158530 | .03337243 | .03520612 | .03708447 |
| 57 | .02956120 | .03130712 | .03310204 | .03494404 | .03683114 |
| 58 | .02928667 | .03103977 | .03284244 | .03469270 | .03658848 |
| 59 | .02902243 | .03078268 | .03259307 | .03445153 | .03635593 |
| 60 | .02876797 | .03053533 | .03235340 | .03422002 | .03613296 |
| 61 | .02852278 | .03029724 | .03212294 | .03399767 | .03591908 |
| 62 | .02828643 | .03006795 | .03190126 | .03378402 | .03571385 |
| 63 | .02805848 | .02984704 | .03168790 | .03357866 | .03551682 |
| 64 | .02783855 | .02963411 | .03148249 | .03338118 | .03532760 |
| 65 | .02762624 | .02942878 | .03128463 | .03319120 | .03514581 |
| 66 | .02742122 | .02923070 | .03109398 | .03300837 | .03497110 |
| 67 | .02722316 | .02903955 | .03091021 | .03283236 | .03480313 |
| 68 | .02703173 | .02885500 | .03073300 | .03266285 | .03464159 |
| 69 | .02684665 | .02867677 | .03056206 | .03249955 | .03448618 |
| 70 | .02666765 | .02850458 | .03039712 | .03234218 | .03433663 |
| 71 | .02649446 | .02833816 | .03023790 | .03219048 | .03419266 |
| 72 | .02632683 | .02817728 | .03008417 | .03204420 | .03405404 |
| 73 | .02616454 | .02802169 | .02993568 | .03190311 | .03392053 |
| 74 | .02600736 | .02787118 | .02979222 | .03176698 | .03379191 |
| 75 | .02585508 | .02772554 | .02965358 | .03163560 | .03366796 |
| 76 | .02570751 | .02758457 | .02951956 | .03150878 | .03354849 |
| 77 | .02556447 | .02744808 | .02938997 | .03138633 | .03343331 |
| 78 | .02542576 | .02731589 | .02926463 | .03126806 | .03332224 |
| 79 | .02529123 | .02718784 | .02914338 | .03115382 | .03321510 |
| 80 | .02516071 | .02706376 | .02902605 | .03104342 | .03311175 |
| 81 | .02503405 | .02694350 | .02891248 | .03093674 | .03301201 |
| 82 | .02491110 | .02682692 | .02880254 | .03083361 | .03291576 |
| 83 | .02479173 | .02671387 | .02869608 | .03073389 | .03282284 |
| 84 | .02467581 | .02660423 | .02859298 | .03063747 | .03273313 |
| 85 | .02456321 | .02649787 | .02849310 | .03054420 | .03264650 |
| 86 | .02445381 | .02639467 | .02839633 | .03045397 | .03256284 |
| 87 | .02434750 | .02629452 | .02830255 | .03036667 | .03248202 |
| 88 | .02424416 | .02619730 | .02821165 | .03028219 | .03240393 |
| 89 | .02414370 | .02610291 | .02812353 | .03020041 | .03232848 |
| 90 | .02404602 | .02601126 | .02803809 | .03012125 | .03225556 |
| 91 | .02395101 | .02592224 | .02795523 | .03004460 | .03218508 |
| 92 | .02385859 | .02583577 | .02787486 | .02997038 | .03211694 |
| 93 | .02376868 | .02575176 | .02779690 | .02989850 | .03205107 |
| 94 | .02368118 | .02567012 | .02772126 | .02982887 | .03198737 |
| 95 | .02359602 | .02559078 | .02764786 | .02976141 | .03192577 |
| 96 | .02351313 | .02551366 | .02757662 | .02969605 | .03186619 |
| 97 | .02343242 | .02543868 | .02750747 | .02963272 | .03180856 |
| 98 | .02335383 | .02536578 | .02744034 | .02957134 | .03175281 |
| 99 | .02327729 | .02529489 | .02737517 | .02951185 | .03169886 |
| 100 | .02320274 | .02522594 | .02731188 | .02945418 | .03164667 |

INTEREST TABLES (Continued)

ANNUITY WHOSE PRESENT VALUE IS 1

$$a_n^{-1} = i/(1 - v^n) = s_n^{-1} + i \text{ (Continued)}$$

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|---------------|------------|------------|------------|------------|
| | .035(3½ %) | .04(4 %) | .045(4½ %) | .05(5 %) | .055(5½ %) |
| 1 | 1.03500000 | 1.04000000 | 1.04500000 | 1.05000000 | 1.05500000 |
| 2 | 0.52640049 | 0.53019608 | 0.53399756 | 0.53780488 | 0.54161800 |
| 3 | .35693418 | .36034854 | .36377336 | .36720856 | .37065407 |
| 4 | .27225114 | .27549005 | .27874365 | .28201183 | .28529449 |
| 5 | .22148137 | .22462711 | .22779164 | .23097480 | .23417644 |
| 6 | .18766821 | .19076190 | .19387839 | .19701747 | .20017895 |
| 7 | .16354449 | .16660961 | .16970147 | .17281982 | .17596442 |
| 8 | .14547665 | .14852783 | .15160965 | .15472181 | .15786401 |
| 9 | .13144601 | .13449299 | .13757447 | .14069008 | .14383946 |
| 10 | .12024137 | .12329094 | .12637882 | .12950457 | .13266777 |
| 11 | .11109197 | .11414904 | .11724818 | .12038889 | .12357065 |
| 12 | .10348395 | .10655217 | .10966619 | .11282541 | .11602923 |
| 13 | .09706157 | .10014373 | .10327535 | .10645577 | .10968426 |
| 14 | .09157073 | .09466897 | .09782032 | .10102397 | .10427912 |
| 15 | .08682507 | .08994110 | .09311381 | .09634229 | .09962560 |
| 16 | .08268483 | .08582000 | .08901537 | .09226991 | .09558254 |
| 17 | .07904313 | .08219852 | .08541758 | .08869914 | .09204197 |
| 18 | .07581684 | .07899333 | .08223690 | .08554622 | .08891992 |
| 19 | .07294033 | .07613862 | .07940734 | .08274501 | .08615006 |
| 20 | .07036108 | .07358175 | .07687614 | .08024259 | .08367933 |
| 21 | .06803659 | .07128011 | .07460057 | .07799611 | .08146478 |
| 22 | .06593207 | .06919881 | .07254565 | .07597051 | .07947123 |
| 23 | .06401880 | .06730906 | .07068249 | .07413682 | .07766965 |
| 24 | .06227283 | .06558683 | .06898703 | .07247090 | .07603580 |
| 25 | .06067404 | .06401196 | .06743903 | .07095246 | .07454935 |
| 26 | .05920540 | .06256738 | .06602137 | .06956432 | .07319307 |
| 27 | .05785241 | .06123854 | .06471946 | .06829186 | .07195228 |
| 28 | .05660265 | .06001298 | .06352081 | .06712253 | .07081440 |
| 29 | .05544538 | .05887993 | .06241461 | .06604551 | .06976857 |
| 30 | .05437133 | .05783010 | .06139154 | .06505144 | .06880539 |
| 31 | .05337240 | .05685535 | .06044345 | .06413212 | .06791665 |
| 32 | .05244150 | .05594859 | .05956320 | .0628042 | .06709519 |
| 33 | .05157242 | .05510357 | .05874453 | .06149004 | .06633469 |
| 34 | .05075966 | .05431477 | .05798191 | .06175545 | .06562958 |
| 35 | .04999835 | .05357732 | .05727045 | .06107171 | .06497493 |
| 36 | .04928416 | .05288688 | .05660578 | .06043446 | .06436635 |
| 37 | .04861325 | .05223957 | .05598402 | .05983979 | .06379993 |
| 38 | .04798214 | .05163192 | .05540169 | .05928423 | .06327217 |
| 39 | .04738775 | .05106083 | .05485567 | .05876462 | .06277991 |
| 40 | .04682728 | .05052349 | .05434315 | .05827816 | .06232034 |
| 41 | .04629822 | .05001738 | .05386158 | .05782229 | .06189090 |
| 42 | .04579828 | .04954020 | .05340868 | .05739471 | .06148927 |
| 43 | .04532539 | .04908989 | .05298235 | .05699333 | .06111337 |
| 44 | .04487768 | .04866454 | .05258071 | .05661625 | .06076128 |
| 45 | .04445343 | .04826246 | .05220202 | .05626173 | .06043127 |
| 46 | .04405108 | .04788205 | .05184471 | .05592820 | .06012175 |
| 47 | .04366919 | .04752189 | .05150734 | .05561421 | .05983129 |
| 48 | .04330646 | .04718065 | .05118858 | .05531843 | .05955854 |
| 49 | .04296167 | .04685712 | .05088722 | .05503965 | .05930230 |
| 50 | .04263371 | .04655020 | .05060215 | .05477674 | .05906145 |

INTEREST TABLES (Continued)

ANNUITY WHOSE PRESENT VALUE IS 1

$$a_{\overline{n}|}^{-1} = i/(1 - v^n) = s_{\overline{n}|}^{-1} + i \text{ (Continued)}$$

| Years <i>n</i> | Rate <i>i</i> | | | | |
|-------------------|---------------|------------|------------|------------|------------|
| | .06 (6%) | .065 (6½%) | .07 (7%) | .075 (7½%) | .08 (8%) |
| 1 | 1.06000000 | 1.06500000 | 1.07000000 | 1.07500000 | 1.08000000 |
| 2 | 0.54543689 | 0.54926150 | 0.55309179 | 0.55692771 | 0.56076923 |
| 3 | .37410981 | .37757570 | .38105167 | .38453763 | .38803351 |
| 4 | .28859149 | .29190274 | .29522812 | .29856751 | .30192080 |
| 5 | .23739640 | .24063454 | .24389069 | .24716472 | .25045645 |
| 6 | .20336263 | .20656831 | .20979580 | .21304489 | .21631539 |
| 7 | .17913502 | .18233137 | .18555322 | .18880032 | .19207240 |
| 8 | .16103594 | .16423730 | .16746776 | .17072702 | .17401476 |
| 9 | .14702224 | .15023803 | .15348647 | .15676716 | .16007971 |
| 10 | .13586796 | .13910469 | .14237750 | .14568593 | .14902949 |
| 11 | .12679294 | .13005521 | .13335690 | .13669747 | .14007634 |
| 12 | .11927703 | .12256817 | .12590199 | .12927783 | .13269602 |
| 13 | .11296011 | .11628256 | .11965085 | .12306420 | .12652181 |
| 14 | .10758491 | .11094048 | .11434494 | .11779737 | .12129685 |
| 15 | .10296276 | .10635278 | .10979462 | .11328724 | .11682954 |
| 16 | .09895214 | .10237757 | .10585765 | .10939116 | .11297687 |
| 17 | .09544480 | .09890633 | .10242519 | .10600003 | .10962943 |
| 18 | .09235654 | .09585461 | .09941260 | .10302896 | .10670210 |
| 19 | .08962086 | .09315575 | .09675301 | .10041090 | .10412763 |
| 20 | .08718456 | .09075640 | .09439293 | .09809219 | .10185221 |
| 21 | .08500455 | .08861333 | .09228900 | .09602937 | .09983225 |
| 22 | .08304557 | .08669120 | .09040577 | .09418687 | .09803207 |
| 23 | .08127848 | .08496078 | .08871393 | .09253528 | .09642217 |
| 24 | .07967900 | .08339770 | .08718902 | .09105008 | .09497796 |
| 25 | .07822672 | .08198148 | .08581052 | .08971067 | .09367878 |
| 26 | .07690435 | .08069480 | .08456103 | .08849961 | .09250713 |
| 27 | .07569717 | .07952288 | .08342573 | .08740204 | .09144810 |
| 28 | .07459255 | .07845305 | .08239193 | .08640520 | .09048891 |
| 29 | .07357961 | .07747440 | .08144865 | .08549811 | .08961854 |
| 30 | .07264891 | .07657744 | .08058640 | .08467124 | .08882743 |
| 31 | .07179222 | .07575393 | .07979691 | .08391628 | .08810728 |
| 32 | .07100234 | .07499665 | .07907292 | .08322599 | .08745081 |
| 33 | .07027293 | .07429924 | .07840807 | .08259397 | .08685163 |
| 34 | .06959843 | .07365610 | .07779674 | .08201461 | .08630411 |
| 35 | .06897386 | .07306226 | .07723396 | .08148291 | .08580326 |
| 36 | .06839483 | .07251332 | .07671531 | .08099447 | .08534467 |
| 37 | .06785743 | .07200534 | .07623685 | .08054533 | .08492440 |
| 38 | .06735812 | .07153480 | .07579505 | .08013197 | .08453894 |
| 39 | .06689377 | .07109854 | .07538676 | .07975124 | .08418513 |
| 40 | .06646154 | .07069373 | .07500914 | .07940031 | .08386016 |
| 41 | .06605886 | .07031779 | .07465962 | .07907663 | .08356149 |
| 42 | .06568342 | .06996842 | .07433591 | .07877789 | .08328684 |
| 43 | .06533312 | .069664352 | .07403590 | .07850201 | .08303414 |
| 44 | .06500606 | .06934119 | .07375769 | .07824710 | .08280152 |
| 45 | .06470050 | .06905968 | .07349957 | .07801146 | .08258728 |
| 46 | .06441485 | .06879743 | .07325996 | .07779354 | .08238991 |
| 47 | .06414768 | .06855300 | .07303744 | .07759190 | .08220799 |
| 48 | .06389765 | .06832505 | .07283070 | .07740527 | .08204027 |
| 49 | .06366356 | .06811240 | .07263853 | .07723247 | .08188557 |
| 50 | .06344429 | .06791393 | .07245985 | .07707241 | .08174286 |

INTEREST TABLES (Continued)

COMPOUND AMOUNT OF 1 FOR FRACTIONAL

PERIODS $(1 + i)^{\frac{1}{p}}$

| p | $\frac{1}{2}\%$ | $1\frac{1}{2}\%$ | $2\frac{1}{2}\%$ | $3\frac{1}{2}\%$ | $4\frac{1}{2}\%$ |
|-----|------------------|------------------|------------------|------------------|------------------|
| 2 | 1.0012 492 | 1.0020 812 | 1.0024 969 | 1.0029 124 | 1.0037 430 |
| 3 | 1.0008 326 | 1.0013 870 | 1.0016 639 | 1.0019 407 | 1.0024 938 |
| 4 | 1.0006 244 | 1.0010 400 | 1.0012 477 | 1.0014 552 | 1.0018 697 |
| 6 | 1.0004 162 | 1.0006 932 | 1.0008 316 | 1.0009 699 | 1.0012 461 |
| 12 | 1.0002 089 | 1.0003 466 | 1.0004 157 | 1.0004 848 | 1.0006 229 |
| 13 | 1.0001 921 | 1.0003 199 | 1.0003 837 | 1.0004 475 | 1.0005 749 |
| 26 | 1.0000 960 | 1.0001 599 | 1.0001 919 | 1.0002 237 | 1.0002 874 |
| 52 | 1.0000 480 | 1.0000 800 | 1.0000 959 | 1.0001 119 | 1.0001 437 |
| 365 | 1.0000 068 | 1.0000 114 | 1.0000 137 | 1.0000 159 | 1.0000 205 |
| p | 1% | $1\frac{1}{2}\%$ | $2\frac{1}{2}\%$ | $3\frac{1}{2}\%$ | $4\frac{1}{2}\%$ |
| 2 | 1.0049 876 | 1.0056 093 | 1.0062 306 | 1.0074 721 | 1.0087 121 |
| 3 | 1.0033 223 | 1.0037 360 | 1.0041 494 | 1.0049 752 | 1.0057 996 |
| 4 | 1.0024 907 | 1.0028 008 | 1.0031 105 | 1.0037 291 | 1.0043 466 |
| 6 | 1.0016 598 | 1.0018 663 | 1.0020 726 | 1.0024 845 | 1.0028 956 |
| 12 | 1.0008 295 | 1.0009 327 | 1.0010 357 | 1.0012 415 | 1.0014 468 |
| 13 | 1.0007 657 | 1.0008 609 | 1.0009 560 | 1.0011 459 | 1.0013 354 |
| 26 | 1.0003 828 | 1.0004 304 | 1.0004 779 | 1.0005 728 | 1.0006 675 |
| 52 | 1.0001 914 | 1.0002 152 | 1.0002 389 | 1.0002 864 | 1.0003 337 |
| 365 | 1.0000 273 | 1.0000 307 | 1.0000 340 | 1.0000 408 | 1.0000 475 |
| p | 2% | $2\frac{1}{2}\%$ | $2\frac{1}{2}\%$ | $2\frac{3}{4}\%$ | 3% |
| 2 | 1.0099 505 | 1.0111 874 | 1.0124 228 | 1.0136 568 | 1.0148 892 |
| 3 | 1.0066 227 | 1.0074 444 | 1.0082 648 | 1.0090 839 | 1.0099 016 |
| 4 | 1.0049 629 | 1.0055 782 | 1.0061 922 | 1.0068 052 | 1.0074 171 |
| 6 | 1.0033 059 | 1.0037 153 | 1.0041 239 | 1.0045 317 | 1.0049 386 |
| 12 | 1.0016 516 | 1.0018 559 | 1.0020 598 | 1.0022 633 | 1.0024 663 |
| 13 | 1.0015 244 | 1.0017 130 | 1.0019 012 | 1.0020 890 | 1.0022 763 |
| 26 | 1.0007 619 | 1.0008 562 | 1.0009 502 | 1.0010 440 | 1.0011 375 |
| 52 | 1.0003 809 | 1.0004 280 | 1.0004 750 | 1.0005 218 | 1.0005 686 |
| 365 | 1.0000 543 | 1.0000 610 | 1.0000 676 | 1.0000 743 | 1.0000 810 |
| p | $3\frac{1}{2}\%$ | 4% | $4\frac{1}{2}\%$ | 5% | $5\frac{1}{2}\%$ |
| 2 | 1.0173 495 | 1.0198 039 | 1.0222 524 | 1.0246 951 | 1.0271 319 |
| 3 | 1.0115 331 | 1.0131 594 | 1.0147 805 | 1.0163 964 | 1.0180 071 |
| 4 | 1.0086 374 | 1.0098 534 | 1.0110 650 | 1.0122 722 | 1.0134 752 |
| 6 | 1.0057 500 | 1.0065 582 | 1.0073 631 | 1.0081 649 | 1.0089 634 |
| 12 | 1.0028 709 | 1.0032 737 | 1.0036 748 | 1.0040 741 | 1.0044 717 |
| 13 | 1.0026 498 | 1.0030 215 | 1.0033 916 | 1.0037 601 | 1.0041 270 |
| 26 | 1.0013 240 | 1.0015 096 | 1.0016 944 | 1.0018 783 | 1.0020 614 |
| 52 | 1.0006 618 | 1.0007 545 | 1.0008 468 | 1.0009 387 | 1.0010 302 |
| 365 | 1.0000 942 | 1.0001 075 | 1.0001 206 | 1.0001 337 | 1.0001 467 |
| p | 6% | $6\frac{1}{2}\%$ | 7% | $7\frac{1}{2}\%$ | 8% |
| 2 | 1.0295 630 | 1.0319 884 | 1.0344 080 | 1.0368 221 | 1.0392 305 |
| 3 | 1.0196 128 | 1.0212 135 | 1.0228 091 | 1.0243 998 | 1.0259 856 |
| 4 | 1.0146 738 | 1.0158 683 | 1.0170 585 | 1.0182 446 | 1.0194 265 |
| 6 | 1.0097 588 | 1.0105 511 | 1.0113 403 | 1.0121 264 | 1.0129 095 |
| 12 | 1.0048 676 | 1.0052 617 | 1.0056 541 | 1.0060 449 | 1.0064 340 |
| 13 | 1.0044 923 | 1.0048 560 | 1.0052 181 | 1.0055 786 | 1.0059 376 |
| 26 | 1.0022 436 | 1.0024 250 | 1.0026 056 | 1.0027 854 | 1.0029 644 |
| 52 | 1.0011 212 | 1.0012 118 | 1.0013 020 | 1.0013 918 | 1.0014 811 |
| 365 | 1.0001 596 | 1.0001 726 | 1.0001 854 | 1.0001 982 | 1.0002 109 |

INTEREST TABLES (Continued)

NOMINAL RATES CONVERTIBLE p TIMES PER YEAR
EQUIVALENT TO EFFECTIVE RATE i GIVEN IN

$$\text{HEADING, } j_p = p[(1 + i)^{\frac{1}{p}} - 1]$$

| p | $\frac{1}{4}\%$ | $\frac{1}{2}\%$ | $\frac{3}{4}\%$ | 1% | $1\frac{1}{4}\%$ |
|---------------|------------------|------------------|------------------|------------------|------------------|
| $\frac{1}{4}$ | .0025 094 | .0041 928 | .0050 376 | .0058 846 | .0075 848 |
| $\frac{1}{2}$ | .0025 032 | .0041 754 | .0050 125 | .0058 504 | .0075 281 |
| 2 | .0024 984 | .0041 623 | .0049 938 | .0058 249 | .0074 860 |
| 4 | .0024 977 | .0041 602 | .0049 907 | .0058 206 | .0074 790 |
| 6 | .0024 974 | .0041 595 | .0049 896 | .0058 192 | .0074 767 |
| 12 | .0024 971 | .0041 587 | .0049 886 | .0058 178 | .0074 743 |
| 13 | .0024 971 | .0041 587 | .0049 885 | .0058 177 | .0074 742 |
| 52 | .0024 969 | .0041 582 | .0049 878 | .0058 167 | .0074 725 |
| 365 | .0024 969 | .0041 580 | .0049 876 | .0058 164 | .0074 721 |
| ∞ | .0024 969 | .0041 580 | .0049 875 | .0058 164 | .0074 720 |
| p | 1% | $1\frac{1}{4}\%$ | $1\frac{1}{2}\%$ | $1\frac{3}{4}\%$ | 2% |
| $\frac{1}{4}$ | .0101 510 | .0114 413 | .0127 363 | .0153 409 | .0179 648 |
| $\frac{1}{2}$ | .0100 500 | .0113 133 | .0125 781 | .0151 125 | .0176 531 |
| 2 | .0099 751 | .0112 185 | .0124 612 | .0149 442 | .0174 241 |
| 4 | .0099 627 | .0112 029 | .0124 418 | .0149 164 | .0173 863 |
| 6 | .0099 586 | .0111 976 | .0124 354 | .0149 071 | .0173 737 |
| 12 | .0099 545 | .0111 924 | .0124 290 | .0148 979 | .0173 612 |
| 13 | .0099 541 | .0111 920 | .0124 285 | .0148 971 | .0173 602 |
| 52 | .0099 513 | .0111 884 | .0124 240 | .0148 907 | .0173 515 |
| 365 | .0099 505 | .0111 874 | .0124 227 | .0148 889 | .0173 490 |
| ∞ | .0099 503 | .0111 872 | .0124 225 | .0148 886 | .0173 486 |
| p | 2% | $2\frac{1}{4}\%$ | $2\frac{1}{2}\%$ | $2\frac{3}{4}\%$ | 3% |
| $\frac{1}{4}$ | .0206 080 | .0232 708 | .0259 532 | .0286 553 | .0313 772 |
| $\frac{1}{2}$ | .0202 000 | .0227 531 | .0253 125 | .0278 781 | .0304 500 |
| 2 | .0199 010 | .0223 748 | .0248 457 | .0273 135 | .0297 783 |
| 4 | .0198 517 | .0223 126 | .0247 690 | .0272 209 | .0296 683 |
| 6 | .0198 353 | .0222 919 | .0247 435 | .0271 901 | .0296 317 |
| 12 | .0198 190 | .0222 713 | .0247 180 | .0271 594 | .0295 952 |
| 13 | .0198 177 | .0222 697 | .0247 161 | .0271 570 | .0295 924 |
| 52 | .0198 064 | .0222 554 | .0246 985 | .0271 358 | .0295 672 |
| 365 | .0198 032 | .0222 513 | .0246 934 | .0271 297 | .0295 600 |
| ∞ | .0198 026 | .0222 506 | .0246 926 | .0271 287 | .0295 588 |
| p | $3\frac{1}{2}\%$ | 4% | $4\frac{1}{2}\%$ | 5% | $5\frac{1}{2}\%$ |
| $\frac{1}{4}$ | .0368 808 | .0424 647 | .0481 297 | .0538 766 | .0597 062 |
| $\frac{1}{2}$ | .0356 125 | .0408 000 | .0460 125 | .0512 500 | .0565 125 |
| 2 | .0346 990 | .0396 078 | .0445 048 | .0493 902 | .0542 639 |
| 4 | .0345 498 | .0394 136 | .0442 600 | .0490 889 | .0539 007 |
| 6 | .0345 002 | .0393 492 | .0441 787 | .0489 891 | .0537 804 |
| 12 | .0344 508 | .0392 849 | .0440 977 | .0488 895 | .0536 604 |
| 13 | .0344 470 | .0392 799 | .0440 915 | .0488 818 | .0536 512 |
| 52 | .0344 128 | .0392 355 | .0440 355 | .0488 131 | .0535 683 |
| 365 | .0344 030 | .0392 228 | .0440 195 | .0487 934 | .0535 447 |
| ∞ | .0344 014 | .0392 207 | .0440 169 | .0487 902 | .0535 408 |
| p | 6% | $6\frac{1}{2}\%$ | 7% | $7\frac{1}{2}\%$ | 8% |
| $\frac{1}{4}$ | .0656 193 | .0716 166 | .0776 990 | .0838 673 | .0901 223 |
| $\frac{1}{2}$ | .0618 000 | .0671 125 | .0724 500 | .0778 125 | .0832 000 |
| 2 | .0591 260 | .0639 767 | .0688 161 | .0736 441 | .0784 610 |
| 4 | .0586 954 | .0634 731 | .0682 341 | .0729 784 | .0777 062 |
| 6 | .0585 528 | .0633 064 | .0680 416 | .0727 583 | .0774 567 |
| 12 | .0584 106 | .0631 403 | .0678 497 | .0725 390 | .0772 084 |
| 13 | .0583 997 | .0631 276 | .0678 350 | .0725 222 | .0771 893 |
| 52 | .0583 016 | .0630 129 | .0677 027 | .0723 710 | .0770 180 |
| 365 | .0582 736 | .0629 802 | .0676 649 | .0723 278 | .0769 692 |
| ∞ | .0582 689 | .0629 748 | .0676 586 | .0723 207 | .0769 610 |

INTEREST TABLES (Continued)

AMOUNT FOR YEAR OF p DEPOSITS OF $1/p$, p TIMES PER YEAR, i/j_p

| p | $\frac{1}{2}\%$ | $\frac{5}{12}\%$ | $\frac{1}{2}\%$ | $\frac{7}{12}\%$ | $\frac{3}{4}\%$ |
|---------------|------------------|------------------|------------------|------------------|------------------|
| $\frac{1}{4}$ | 0.9962 5 | 0.9937 717 | 0.9925 312 | 0.9912 924 | 0.9888 201 |
| $\frac{1}{2}$ | 0.9974 8 | 0.9979 210 | 0.9975 062 | 0.9970 918 | 0.9962 640 |
| 2 | 1.0006 246 | 1.0010 406 | 1.0012 484 | 1.0014 562 | 1.0018 715 |
| 4 | 1.0009 370 | 1.0015 611 | 1.0018 730 | 1.0021 848 | 1.0028 081 |
| 6 | 1.0010 412 | 1.0017 347 | 1.0020 813 | 1.0024 278 | 1.0031 205 |
| 12 | 1.0011 453 | 1.0019 083 | 1.0022 896 | 1.0026 708 | 1.0034 329 |
| 13 | 1.0011 533 | 1.0019 216 | 1.0023 056 | 1.0026 895 | 1.0034 569 |
| 52 | 1.0012 254 | 1.0020 418 | 1.0024 498 | 1.0028 577 | 1.0036 732 |
| 365 | 1.0012 461 | 1.0020 762 | 1.0024 911 | 1.0029 058 | 1.0037 351 |
| ∞ | 1.0012 495 | 1.0020 819 | 1.0024 979 | 1.0029 138 | 1.0037 453 |
| p | 1% | $1\frac{1}{8}\%$ | $1\frac{1}{4}\%$ | $1\frac{1}{2}\%$ | $1\frac{3}{4}\%$ |
| $\frac{1}{4}$ | 0.9851 244 | 0.9832 823 | 0.9814 441 | 0.9777 791 | 0.9741 295 |
| $\frac{1}{2}$ | 0.9950 249 | 0.9944 065 | 0.9937 838 | 0.9925 558 | 0.9913 259 |
| 2 | 1.0024 938 | 1.0028 046 | 1.0031 153 | 1.0037 360 | 1.0043 618 |
| 4 | 1.0037 422 | 1.0042 089 | 1.0046 754 | 1.0056 076 | 1.0065 388 |
| 6 | 1.0041 586 | 1.0046 773 | 1.0051 958 | 1.0062 319 | 1.0072 671 |
| 12 | 1.0045 751 | 1.0051 458 | 1.0057 163 | 1.0068 565 | 1.0079 957 |
| 13 | 1.0046 071 | 1.0051 819 | 1.0057 564 | 1.0069 046 | 1.0080 518 |
| 52 | 1.0048 956 | 1.0055 063 | 1.0061 169 | 1.0073 372 | 1.0085 564 |
| 365 | 1.0049 780 | 1.0055 991 | 1.0062 199 | 1.0074 608 | 1.0087 007 |
| ∞ | 1.0049 917 | 1.0056 145 | 1.0062 371 | 1.0074 814 | 1.0087 247 |
| p | 2% | $2\frac{1}{2}\%$ | $2\frac{1}{2}\%$ | $2\frac{3}{4}\%$ | 3% |
| $\frac{1}{4}$ | 0.9704 950 | 0.9668 757 | 0.9632 715 | 0.9596 824 | 0.9561 082 |
| $\frac{1}{2}$ | 0.9900 990 | 0.9888 752 | 0.9876 543 | 0.9864 365 | 0.9852 217 |
| 2 | 1.0049 752 | 1.0055 937 | 1.0062 114 | 1.0068 284 | 1.0074 446 |
| 4 | 1.0074 686 | 1.0083 984 | 1.0093 268 | 1.0102 542 | 1.0111 807 |
| 6 | 1.0083 013 | 1.0093 344 | 1.0103 667 | 1.0113 979 | 1.0124 282 |
| 12 | 1.0091 339 | 1.0102 711 | 1.0114 072 | 1.0125 424 | 1.0136 766 |
| 13 | 1.0091 980 | 1.0103 431 | 1.0114 873 | 1.0126 305 | 1.0137 727 |
| 52 | 1.0097 747 | 1.0109 919 | 1.0122 082 | 1.0134 234 | 1.0146 376 |
| 365 | 1.0099 396 | 1.0111 775 | 1.0124 143 | 1.0136 502 | 1.0148 850 |
| ∞ | 1.0099 670 | 1.0112 083 | 1.0124 486 | 1.0136 878 | 1.0149 261 |
| p | $3\frac{1}{2}\%$ | 4% | $4\frac{1}{2}\%$ | 5% | $5\frac{1}{2}\%$ |
| $\frac{1}{4}$ | 0.9490 046 | 0.9419 6 | 0.9349 7 | 0.9280 5 | 0.9211 8 |
| $\frac{1}{2}$ | 0.9828 010 | 0.9803 922 | 0.9779 951 | 0.9756 098 | 0.9732 360 |
| 2 | 1.0086 748 | 1.0099 020 | 1.0111 262 | 1.0123 475 | 1.0135 660 |
| 4 | 1.0130 309 | 1.0148 774 | 1.0167 203 | 1.0185 594 | 1.0203 950 |
| 6 | 1.0144 858 | 1.0165 396 | 1.0185 895 | 1.0206 357 | 1.0226 781 |
| 12 | 1.0159 420 | 1.0182 035 | 1.0204 611 | 1.0227 148 | 1.0249 647 |
| 13 | 1.0160 541 | 1.0183 316 | 1.0206 051 | 1.0228 748 | 1.0251 407 |
| 52 | 1.0170 632 | 1.0194 847 | 1.0219 623 | 1.0243 160 | 1.0267 259 |
| 365 | 1.0173 517 | 1.0198 145 | 1.0222 733 | 1.0247 282 | 1.0271 793 |
| ∞ | 1.0173 997 | 1.0198 693 | 1.0223 349 | 1.0247 967 | 1.0272 546 |
| p | 6% | $6\frac{1}{2}\%$ | 7% | $7\frac{1}{2}\%$ | 8% |
| $\frac{1}{4}$ | 0.9143 7 | 0.9076 1 | 0.9009 1 | 0.8942 7 | 0.8876 8 |
| $\frac{1}{2}$ | 0.9708 738 | 0.9685 230 | 0.9661 836 | 0.9638 554 | 0.9615 385 |
| 2 | 1.0147 815 | 1.0159 942 | 1.0172 040 | 1.0184 110 | 1.0196 152 |
| 4 | 1.0222 269 | 1.0240 552 | 1.0258 800 | 1.0277 013 | 1.0295 190 |
| 6 | 1.0247 168 | 1.0267 517 | 1.0287 830 | 1.0308 106 | 1.0328 346 |
| 12 | 1.0272 107 | 1.0294 529 | 1.0316 914 | 1.0339 262 | 1.0361 572 |
| 13 | 1.0274 027 | 1.0296 609 | 1.0319 154 | 1.0341 661 | 1.0364 131 |
| 52 | 1.0291 319 | 1.0315 340 | 1.0339 324 | 1.0363 270 | 1.0387 179 |
| 365 | 1.0296 265 | 1.0320 699 | 1.0345 095 | 1.0369 453 | 1.0393 774 |
| ∞ | 1.0297 087 | 1.0321 589 | 1.0346 053 | 1.0370 480 | 1.0394 870 |

AMERICAN EXPERIENCE MORTALITY TABLE

Based on 100,000 living at age 10, giving: l_x , number of living; d_x , number of deaths; p_x , probability of living; q_x , probability of dying for age x from 10 to 95.

| x | l_x | d_x | p_x | q_x | x | l_x | d_x | p_x | q_x |
|-----|--------|-------|---------|---------|-----|-------|-------|---------|----------|
| 10 | 100000 | 749 | .992510 | .007490 | 55 | 64563 | 1199 | .981429 | .018571 |
| 11 | 99251 | 746 | .992484 | .007516 | 56 | 63364 | 1260 | .980115 | .019885 |
| 12 | 98505 | 743 | .992457 | .007543 | 57 | 62104 | 1325 | .978665 | .021335 |
| 13 | 97762 | 740 | .992431 | .007569 | 58 | 60779 | 1394 | .977064 | .022936 |
| 14 | 97022 | 737 | .992404 | .007596 | 59 | 59385 | 1468 | .975280 | .024720 |
| 15 | 96285 | 735 | .992366 | .007634 | 60 | 57917 | 1546 | .973307 | .026693 |
| 16 | 95550 | 732 | .992339 | .007661 | 61 | 56371 | 1628 | .971120 | .028880 |
| 17 | 94818 | 729 | .992312 | .007688 | 62 | 54743 | 1713 | .968708 | .031292 |
| 18 | 94089 | 727 | .992273 | .007727 | 63 | 53030 | 1800 | .966057 | .033943 |
| 19 | 93362 | 725 | .992235 | .007765 | 64 | 51230 | 1889 | .963127 | .036873 |
| 20 | 92637 | 723 | .992195 | .007805 | 65 | 49341 | 1980 | .959871 | .040129 |
| 21 | 91914 | 722 | .992145 | .007855 | 66 | 47361 | 2070 | .956293 | .043707 |
| 22 | 91192 | 721 | .992094 | .007906 | 67 | 45291 | 2158 | .952353 | .047647 |
| 23 | 90471 | 720 | .992042 | .007958 | 68 | 43133 | 2243 | .947998 | .052002 |
| 24 | 89751 | 719 | .991989 | .008011 | 69 | 40890 | 2321 | .943238 | .056762 |
| 25 | 89032 | 718 | .991935 | .008065 | 70 | 38569 | 2391 | .938007 | .061993 |
| 26 | 88314 | 718 | .991870 | .008130 | 71 | 36178 | 2448 | .932335 | .067665 |
| 27 | 87596 | 718 | .991803 | .008197 | 72 | 33730 | 2487 | .926267 | .073733 |
| 28 | 86878 | 718 | .991736 | .008264 | 73 | 31243 | 2505 | .919822 | .080178 |
| 29 | 86160 | 719 | .991655 | .008345 | 74 | 28738 | 2501 | .912972 | .087028 |
| 30 | 85441 | 720 | .991573 | .008427 | 75 | 26237 | 2476 | .905629 | .094371 |
| 31 | 84721 | 721 | .991490 | .008510 | 76 | 23761 | 2431 | .897689 | .102311 |
| 32 | 84000 | 723 | .991393 | .008607 | 77 | 21330 | 2369 | .888936 | .111064 |
| 33 | 83277 | 726 | .991282 | .008718 | 78 | 18961 | 2291 | .879173 | .120827 |
| 34 | 82551 | 729 | .991169 | .008831 | 79 | 16670 | 2196 | .868266 | .131734 |
| 35 | 81822 | 732 | .991054 | .008946 | 80 | 14474 | 2091 | .855534 | .144466 |
| 36 | 81090 | 737 | .990911 | .009089 | 81 | 12383 | 1964 | .841395 | .158605 |
| 37 | 80353 | 742 | .990766 | .009234 | 82 | 10419 | 1816 | .825703 | .174297 |
| 38 | 79611 | 749 | .990592 | .009408 | 83 | 8603 | 1648 | .808439 | .191561 |
| 39 | 78862 | 756 | .990414 | .009586 | 84 | 6955 | 1470 | .788641 | .211359 |
| 40 | 78106 | 765 | .990206 | .009794 | 85 | 5485 | 1292 | .764448 | .235552 |
| 41 | 77341 | 774 | .989992 | .010008 | 86 | 4193 | 1114 | .734319 | .265681 |
| 42 | 76567 | 785 | .989748 | .010252 | 87 | 3079 | 933 | .696980 | .303020 |
| 43 | 75782 | 797 | .989483 | .010517 | 88 | 2146 | 744 | .653308 | .346692 |
| 44 | 74985 | 812 | .989171 | .010829 | 89 | 1402 | 555 | .604137 | .395863 |
| 45 | 74173 | 828 | .988837 | .011163 | 90 | 847 | 385 | .545455 | .454545 |
| 46 | 73345 | 848 | .988438 | .011562 | 91 | 462 | 246 | .467532 | .532468 |
| 47 | 72497 | 870 | .988000 | .012000 | 92 | 216 | 137 | .365741 | .634259 |
| 48 | 71627 | 896 | .987491 | .012509 | 93 | 79 | 58 | .265823 | .734177 |
| 49 | 70731 | 927 | .986894 | .013106 | 94 | 21 | 18 | .142857 | .857143 |
| 50 | 69804 | 962 | .986219 | .013781 | 95 | 3 | 3 | .000000 | 1.000000 |
| 51 | 68842 | 1001 | .985459 | .014541 | | | | | |
| 52 | 67841 | 1044 | .984611 | .015389 | | | | | |
| 53 | 66797 | 1091 | .983667 | .016333 | | | | | |
| 54 | 65706 | 1143 | .982604 | .017396 | | | | | |

COMMUTATION COLUMNS 3%

$$\begin{aligned} N_x &= D_x + D_{x+1} + D_{x+2} \cdots + D_{95} \\ M_x &= C_x + C_{x+1} + C_{x+2} \cdots + C_{95} \\ 1 + a_x &= N_x / D_x & A_x &= M_x / D_x \\ D_x &= v^x l_x & C_x &= v^{x+1} d_x \end{aligned}$$

| x | D_x | N_x | C_x | M_x | $1 + a_x$ | A_x |
|-----|---------|----------|---------|---------|-----------|---------|
| 10 | 74409.4 | 1811 346 | 541.094 | 21651.7 | 24.3430 | .290981 |
| 11 | 71701.0 | 1736 936 | 523.229 | 21110.7 | 24.2247 | .294426 |
| 12 | 69089.4 | 1665 235 | 505.947 | 20587.4 | 24.1026 | .297982 |
| 13 | 66571.2 | 1596 146 | 489.227 | 20081.5 | 23.9765 | .301654 |
| 14 | 64143.0 | 1529 575 | 473.052 | 19592.3 | 23.8463 | .305447 |
| 15 | 61801.7 | 1465 432 | 458.028 | 19119.2 | 23.7118 | .309364 |
| 16 | 59543.6 | 1403 630 | 442.872 | 18661.2 | 23.5731 | .313403 |
| 17 | 57366.4 | 1344 086 | 428.211 | 18218.3 | 23.4298 | .317578 |
| 18 | 55267.4 | 1286 720 | 414.598 | 17790.1 | 23.2817 | .321891 |
| 19 | 53243.0 | 1231 453 | 401.415 | 17375.5 | 23.1289 | .326343 |
| 20 | 51290.9 | 1178 210 | 388.648 | 16974.1 | 22.9711 | .330938 |
| 21 | 49408.3 | 1126 919 | 376.806 | 16585.4 | 22.8083 | .335681 |
| 22 | 47592.4 | 1077 510 | 365.325 | 16208.6 | 22.6404 | .340571 |
| 23 | 45840.9 | 1029 918 | 354.192 | 15843.3 | 22.4672 | .345615 |
| 24 | 44151.5 | 984 077 | 343.398 | 15489.1 | 22.2886 | .350817 |
| 25 | 42522.2 | 939 926 | 332.933 | 15145.7 | 22.1044 | .356184 |
| 26 | 40950.7 | 897 403 | 323.236 | 14812.8 | 21.9142 | .361722 |
| 27 | 39434.8 | 856 453 | 313.821 | 14489.5 | 21.7182 | .367431 |
| 28 | 37972.4 | 817 018 | 304.681 | 14175.7 | 21.5161 | .373317 |
| 29 | 36561.7 | 779 046 | 296.218 | 13871.0 | 21.3077 | .379387 |
| 30 | 35200.6 | 742 484 | 287.991 | 13574.8 | 21.0930 | .385642 |
| 31 | 33887.3 | 707 283 | 279.991 | 13286.8 | 20.8716 | .392089 |
| 32 | 32620.3 | 673 396 | 272.590 | 13006.8 | 20.6435 | .398734 |
| 33 | 31397.6 | 640 776 | 265.749 | 12734.2 | 20.4084 | .405580 |
| 34 | 30217.4 | 609 378 | 259.074 | 12468.5 | 20.1665 | .412627 |
| 35 | 29078.2 | 579 161 | 252.564 | 12209.4 | 19.9174 | .419883 |
| 36 | 27978.7 | 550 082 | 246.882 | 11956.9 | 19.6608 | .427356 |
| 37 | 26916.9 | 522 104 | 241.318 | 11710.0 | 19.3969 | .435042 |
| 38 | 25891.6 | 495 187 | 236.499 | 11468.7 | 19.1254 | .442949 |
| 39 | 24901.0 | 469 295 | 231.757 | 11232.2 | 18.8465 | .451073 |
| 40 | 23943.9 | 444 394 | 227.685 | 11000.4 | 18.5598 | .459423 |
| 41 | 23018.8 | 420 450 | 223.654 | 10772.7 | 18.2655 | .467996 |
| 42 | 22124.7 | 397 432 | 220.226 | 10549.1 | 17.9632 | .476799 |
| 43 | 21260.1 | 375 307 | 217.080 | 10328.8 | 17.6531 | .485832 |
| 44 | 20423.8 | 354 047 | 214.724 | 10111.8 | 17.3350 | .495097 |
| 45 | 19614.2 | 333 623 | 212.578 | 9897.03 | 17.0093 | .504585 |
| 46 | 18830.3 | 314 009 | 211.371 | 9684.45 | 16.6757 | .514301 |
| 47 | 18070.5 | 295 178 | 210.539 | 9473.08 | 16.3348 | .524229 |
| 48 | 17333.6 | 277 108 | 210.515 | 9262.54 | 15.9867 | .534368 |
| 49 | 16618.3 | 259 774 | 211.455 | 9052.03 | 15.6318 | .544703 |
| 50 | 15922.8 | 243 156 | 213.048 | 8840.57 | 15.2709 | .555215 |
| 51 | 15246.0 | 227 233 | 215.228 | 8627.53 | 14.9045 | .565889 |
| 52 | 14586.7 | 211 987 | 217.935 | 8412.30 | 14.5329 | .576711 |
| 53 | 13943.9 | 197 401 | 221.113 | 8194.36 | 14.1568 | .587667 |
| 54 | 13316.6 | 183 457 | 224.905 | 7973.25 | 13.7765 | .598743 |

COMMUTATION COLUMNS 3% (Continued)

| x | D_x | N_x | C_x | M_x | $1 + a_x$ | A_x |
|-----|----------|----------|----------|----------|-----------|---------|
| 55 | 12703.9 | 170140 | 229.052 | 7748.34 | 13.3928 | .609920 |
| 56 | 12104.8 | 157436 | 233.695 | 7519.29 | 13.0061 | .621182 |
| 57 | 11518.5 | 145331 | 238.593 | 7285.60 | 12.6172 | .632510 |
| 58 | 10944.5 | 133813 | 243.706 | 7047.00 | 12.2265 | .643888 |
| 59 | 10382.0 | 122868 | 249.168 | 6803.30 | 11.8348 | .655298 |
| 60 | 9830.43 | 112486 | 254.764 | 6554.13 | 11.4427 | .666718 |
| 61 | 9289.34 | 102656 | 260.463 | 6299.37 | 11.0509 | .678128 |
| 62 | 8758.32 | 93366.6 | 266.080 | 6038.90 | 10.6603 | .689505 |
| 63 | 8237.14 | 84608.2 | 271.450 | 5772.82 | 10.2716 | .700828 |
| 64 | 7725.77 | 76371.1 | 276.575 | 5501.37 | 9.88524 | .712080 |
| 65 | 7224.18 | 68645.3 | 281.455 | 5224.80 | 9.50217 | .723238 |
| 66 | 6732.31 | 61421.2 | 285.678 | 4943.34 | 9.12334 | .734272 |
| 67 | 6250.54 | 54688.8 | 289.148 | 4657.67 | 8.74945 | .745162 |
| 68 | 5779.34 | 48438.3 | 291.784 | 4368.52 | 8.38128 | .755885 |
| 69 | 5319.23 | 42659.0 | 293.136 | 4076.73 | 8.01976 | .766415 |
| 70 | 4871.16 | 37339.7 | 293.182 | 3783.60 | 7.66547 | .776734 |
| 71 | 4436.10 | 32468.6 | 291.428 | 3490.42 | 7.31916 | .786820 |
| 72 | 4015.47 | 28032.5 | 287.447 | 3198.99 | 6.98112 | .796666 |
| 73 | 3611.07 | 24017.0 | 281.095 | 2911.54 | 6.65094 | .806283 |
| 74 | 3224.79 | 20405.9 | 272.472 | 2630.45 | 6.32783 | .815694 |
| 75 | 2858.40 | 17181.1 | 261.892 | 2357.97 | 6.01076 | .824929 |
| 76 | 2513.25 | 14322.7 | 249.643 | 2096.08 | 5.69889 | .834013 |
| 77 | 2190.41 | 11809.5 | 236.190 | 1846.44 | 5.39146 | .842967 |
| 78 | 1890.42 | 9619.09 | 221.761 | 1610.25 | 5.08834 | .851796 |
| 79 | 1613.60 | 7728.67 | 206.374 | 1388.49 | 4.78972 | .860494 |
| 80 | 1360.22 | 6115.07 | 190.783 | 1182.12 | 4.49563 | .869059 |
| 81 | 1129.82 | 4754.85 | 173.976 | 991.333 | 4.20849 | .877423 |
| 82 | 922.940 | 3625.02 | 156.180 | 817.357 | 3.92769 | .885601 |
| 83 | 739.878 | 2702.08 | 137.604 | 661.177 | 3.65207 | .893629 |
| 84 | 580.725 | 1962.21 | 119.166 | 523.573 | 3.37889 | .901586 |
| 85 | 444.644 | 1381.48 | 101.686 | 404.407 | 3.10694 | .909507 |
| 86 | 330.007 | 936.837 | 85.1229 | 302.721 | 2.83884 | .917315 |
| 87 | 235.272 | 606.829 | 69.2159 | 217.598 | 2.57926 | .924876 |
| 88 | 159.204 | 371.557 | 53.5871 | 148.382 | 2.33384 | .932024 |
| 89 | 100.980 | 212.353 | 38.8099 | 94.7949 | 2.10292 | .938750 |
| 90 | 59.2288 | 111.373 | 26.1381 | 55.9850 | 1.88039 | .945231 |
| 91 | 31.3657 | 52.1442 | 16.2148 | 29.8469 | 1.66246 | .951579 |
| 92 | 14.2373 | 20.7785 | 8.76715 | 13.6321 | 1.45944 | .957492 |
| 93 | 5.05551 | 6.54120 | 3.60354 | 4.86499 | 1.29388 | .962314 |
| 94 | 1.30473 | 1.48569 | 1.08577 | 1.26146 | 1.13870 | .966834 |
| 95 | 0.180961 | 0.180961 | 0.175690 | 0.175690 | 1.00000 | .970874 |

COMMUTATION COLUMNS $3\frac{1}{2}\%$

$$\begin{aligned} N_x &= D_x + D_{x+1} + D_{x+2} + \dots + D_{95} \\ M_x &= C_x + C_{x+1} + C_{x+2} + \dots + C_{95} \\ 1 + a_x &= N_x/D_x & A_x &= M_x/D_x \end{aligned}$$

| x | D_x | N_x | C_x | M_x | $1 + a_x$ | A_x |
|-----|---------|----------|---------|---------|-----------|---------|
| 10 | 70891.9 | 1575 535 | 513.024 | 17612.9 | 22.2245 | .248447 |
| 11 | 67981.5 | 1504 643 | 493.690 | 17099.9 | 22.1331 | .251537 |
| 12 | 65189.0 | 1436 662 | 475.077 | 16606.2 | 22.0384 | .254739 |
| 13 | 62509.4 | 1371 473 | 457.159 | 16131.1 | 21.9403 | .258059 |
| 14 | 59938.4 | 1308 963 | 439.908 | 15674.0 | 21.8385 | .261501 |
| 15 | 57471.6 | 1249 025 | 423.879 | 15234.1 | 21.7329 | .265071 |
| 16 | 55104.2 | 1191 553 | 407.873 | 14810.2 | 21.6236 | .268766 |
| 17 | 52832.9 | 1136 449 | 392.465 | 14402.3 | 21.5102 | .272601 |
| 18 | 50653.9 | 1083 616 | 378.153 | 14009.8 | 21.3926 | .276580 |
| 19 | 48562.8 | 1032 962 | 364.360 | 13631.7 | 21.2707 | .280702 |
| 20 | 46556.2 | 984 400 | 351.068 | 13267.3 | 21.1443 | .284974 |
| 21 | 44630.8 | 937 843 | 338.727 | 12916.3 | 21.0134 | .289402 |
| 22 | 42782.8 | 893 213 | 326.819 | 12577.5 | 20.8779 | .293986 |
| 23 | 41009.2 | 850 430 | 315.329 | 12250.7 | 20.7375 | .298731 |
| 24 | 39307.1 | 809 421 | 304.243 | 11935.4 | 20.5922 | .303644 |
| 25 | 37673.6 | 770 114 | 293.545 | 11631.1 | 20.4417 | .308734 |
| 26 | 36106.1 | 732 440 | 283.619 | 11337.6 | 20.2858 | .314008 |
| 27 | 34601.5 | 696 334 | 274.028 | 11054.0 | 20.1244 | .319465 |
| 28 | 33157.4 | 661 732 | 264.761 | 10779.9 | 19.9573 | .325115 |
| 29 | 31771.3 | 628 575 | 256.164 | 10515.2 | 19.7843 | .330964 |
| 30 | 30440.8 | 596 804 | 247.846 | 10259.0 | 19.6054 | .337016 |
| 31 | 29163.5 | 566 363 | 239.797 | 10011.2 | 19.4202 | .343277 |
| 32 | 27937.5 | 537 199 | 232.331 | 9771.37 | 19.2286 | .349758 |
| 33 | 26760.5 | 509 262 | 225.406 | 9539.04 | 19.0304 | .356460 |
| 34 | 25630.1 | 482 501 | 218.683 | 9313.64 | 18.8256 | .363387 |
| 35 | 24544.7 | 456 871 | 212.158 | 9094.96 | 18.6138 | .370547 |
| 36 | 23502.5 | 432 327 | 206.383 | 8882.80 | 18.3949 | .377951 |
| 37 | 22501.4 | 408 824 | 200.757 | 8676.41 | 18.1688 | .385595 |
| 38 | 21539.7 | 386 323 | 195.798 | 8475.66 | 17.9354 | .393490 |
| 39 | 20615.5 | 364 783 | 190.945 | 8279.86 | 17.6946 | .401632 |
| 40 | 19727.4 | 344 167 | 186.684 | 8088.91 | 17.4461 | .410034 |
| 41 | 18873.6 | 324 440 | 182.493 | 7902.23 | 17.1901 | .418692 |
| 42 | 18052.9 | 305 566 | 178.828 | 7719.74 | 16.9262 | .427618 |
| 43 | 17263.6 | 287 513 | 175.422 | 7540.91 | 16.6543 | .436810 |
| 44 | 16504.4 | 270 250 | 172.679 | 7365.49 | 16.3744 | .446275 |
| 45 | 15773.6 | 253 745 | 170.127 | 7192.81 | 16.0867 | .456004 |
| 46 | 15070.0 | 237 972 | 168.345 | 7022.68 | 15.7911 | .466003 |
| 47 | 14392.1 | 222 902 | 166.872 | 6854.34 | 15.4878 | .476258 |
| 48 | 13738.5 | 208 510 | 166.047 | 6687.47 | 15.1770 | .486768 |
| 49 | 13107.9 | 194 771 | 165.982 | 6521.42 | 14.8591 | .497519 |
| 50 | 12498.6 | 181 663 | 166.424 | 6355.44 | 14.5346 | .508490 |
| 51 | 11909.6 | 169 165 | 167.315 | 6189.01 | 14.2041 | .519668 |
| 52 | 11339.5 | 157 255 | 168.602 | 6021.70 | 13.8679 | .531037 |
| 53 | 10787.4 | 145 916 | 170.234 | 5853.09 | 13.5264 | .542584 |
| 54 | 10252.4 | 135 128 | 172.317 | 5682.86 | 13.1801 | .554295 |

COMMUTATION COLUMNS $3\frac{1}{2}\%$ (Continued)

| x | D_x | N_x | C_x | M_x | $1 + a_x$ | A_x |
|-----|----------|----------|----------|----------|-----------|---------|
| 55 | 9733.40 | 124876 | 174.646 | 5510.54 | 12.8296 | .566148 |
| 56 | 9229.60 | 115142 | 177.325 | 5335.90 | 12.4753 | .578129 |
| 57 | 8740.17 | 105913 | 180.167 | 5158.57 | 12.1179 | .590215 |
| 58 | 8264.44 | 97172.6 | 183.140 | 4978.41 | 11.7579 | .602389 |
| 59 | 7801.82 | 88908.2 | 186.340 | 4795.27 | 11.3958 | .614634 |
| 60 | 7351.65 | 81106.4 | 189.604 | 4608.93 | 11.0324 | .626924 |
| 61 | 6913.44 | 73754.7 | 192.909 | 4419.32 | 10.6683 | .639236 |
| 62 | 6486.75 | 66841.3 | 196.117 | 4226.41 | 10.3043 | .651546 |
| 63 | 6071.27 | 60354.5 | 199.109 | 4030.30 | 9.9410 | .663831 |
| 64 | 5666.85 | 54283.3 | 201.887 | 3831.19 | 9.5791 | .676070 |
| 65 | 5273.33 | 48616.4 | 204.457 | 3629.30 | 9.2193 | .688236 |
| 66 | 4890.55 | 43343.1 | 206.522 | 3424.84 | 8.8626 | .700298 |
| 67 | 4518.65 | 38452.5 | 208.021 | 3218.32 | 8.5097 | .712231 |
| 68 | 4157.82 | 33933.9 | 208.903 | 3010.30 | 8.1615 | .724009 |
| 69 | 3808.32 | 29776.1 | 208.858 | 2801.40 | 7.8187 | .735600 |
| 70 | 3470.67 | 25967.7 | 207.881 | 2592.54 | 7.4820 | .746984 |
| 71 | 3145.43 | 22497.1 | 205.639 | 2384.66 | 7.1523 | .758135 |
| 72 | 2833.42 | 19351.6 | 201.851 | 2179.02 | 6.8298 | .769041 |
| 73 | 2535.75 | 16518.2 | 196.436 | 1977.17 | 6.5141 | .779716 |
| 74 | 2253.57 | 13982.5 | 189.491 | 1780.73 | 6.2046 | .790183 |
| 75 | 1987.87 | 11728.9 | 181.253 | 1591.24 | 5.9002 | .800475 |
| 76 | 1739.39 | 9741.03 | 171.940 | 1409.99 | 5.6002 | .810620 |
| 77 | 1508.63 | 8001.63 | 161.889 | 1238.05 | 5.3039 | .820641 |
| 78 | 1295.73 | 6493.00 | 151.265 | 1076.16 | 5.0111 | .830543 |
| 79 | 1100.65 | 5197.27 | 140.089 | 924.894 | 4.7220 | .840318 |
| 80 | 923.338 | 4096.62 | 128.880 | 784.805 | 4.4368 | .849965 |
| 81 | 763.234 | 3173.29 | 116.959 | 655.925 | 4.1577 | .859402 |
| 82 | 620.465 | 2410.05 | 104.488 | 538.966 | 3.8843 | .868648 |
| 83 | 494.995 | 1789.59 | 91.6153 | 434.478 | 3.6154 | .877741 |
| 84 | 386.641 | 1294.59 | 78.9564 | 342.862 | 3.3483 | .886772 |
| 85 | 294.610 | 907.951 | 67.0490 | 263.906 | 3.0819 | .895782 |
| 86 | 217.598 | 613.342 | 55.8566 | 196.857 | 2.8187 | .904682 |
| 87 | 154.383 | 395.744 | 45.1992 | 141.000 | 2.5634 | .913315 |
| 88 | 103.963 | 241.361 | 34.8243 | 95.8011 | 2.3216 | .921492 |
| 89 | 65.6231 | 137.398 | 25.0993 | 60.9768 | 2.0937 | .929197 |
| 90 | 38.3047 | 71.7747 | 16.8224 | 35.8775 | 1.8738 | .936635 |
| 91 | 20.1869 | 33.4700 | 10.3854 | 19.0551 | 1.6580 | .943932 |
| 92 | 9.11888 | 13.2831 | 5.58815 | 8.66969 | 1.4567 | .950741 |
| 93 | 3.22236 | 4.16421 | 2.28578 | 3.08155 | 1.2923 | .956300 |
| 94 | 0.827611 | 0.941843 | 0.685392 | 0.795762 | 1.1380 | .961516 |
| 95 | 0.114232 | 0.114232 | 0.110369 | 0.110369 | 1.0000 | .966184 |

COMMUTATION COLUMNS 4%

$$N_x = D_x + D_{x+1} + D_{x+2} \dots + D_{95}$$

$$M_x = C_x + C_{x+1} + C_{x+2} \dots + C_{95}$$

$$1 + a_x = N_x / D_x$$

$$A_x = M_x / D_x$$

| x | D_x | N_x | C_x | M_x | $1 + a_x$ | A_x |
|-----|---------|----------|---------|---------|-----------|--------|
| 10 | 67556.4 | 1379 083 | 486.536 | 14514.8 | 20.4138 | 214854 |
| 11 | 64471.6 | 1311 527 | 465.949 | 14028.2 | 20.3427 | 217588 |
| 12 | 61525.9 | 1247 055 | 446.227 | 13562.3 | 20.2688 | 220432 |
| 13 | 58713.3 | 1185 529 | 427.332 | 13116.0 | 20.1918 | 223391 |
| 14 | 56027.8 | 1126 816 | 409.230 | 12688.7 | 20.1117 | 226472 |
| 15 | 53463.6 | 1070 788 | 392.423 | 12279.5 | 20.0283 | 229679 |
| 16 | 51014.9 | 1017 325 | 375.789 | 11887.1 | 19.9417 | 233011 |
| 17 | 48677.0 | 966 310 | 359.855 | 11511.3 | 19.8515 | 236483 |
| 18 | 46445.0 | 917 633 | 345.065 | 11151.4 | 19.7574 | 240099 |
| 19 | 44313.6 | 871 188 | 330.881 | 10806.4 | 19.6596 | 243861 |
| 20 | 42278.3 | 826 874 | 317.277 | 10475.5 | 19.5579 | 247774 |
| 21 | 40335.0 | 784 596 | 304.652 | 10158.2 | 19.4520 | 251846 |
| 22 | 38479.0 | 744 261 | 292.529 | 9853.54 | 19.3420 | 256076 |
| 23 | 36706.5 | 705 782 | 280.887 | 9561.01 | 19.2277 | 260472 |
| 24 | 35013.8 | 669 075 | 269.709 | 9280.12 | 19.1089 | 265042 |
| 25 | 33397.4 | 634 062 | 258.975 | 9010.42 | 18.9854 | 269794 |
| 26 | 31853.9 | 600 664 | 249.014 | 8751.44 | 18.8568 | 274737 |
| 27 | 30379.7 | 568 810 | 239.437 | 8502.43 | 18.7233 | 279872 |
| 28 | 28971.9 | 538 431 | 230.228 | 8262.99 | 18.5846 | 285207 |
| 29 | 27627.3 | 509 459 | 221.681 | 8032.76 | 18.4404 | 290754 |
| 30 | 26343.1 | 481 831 | 213.451 | 7811.08 | 18.2906 | 296514 |
| 31 | 25116.4 | 455 488 | 205.527 | 7597.63 | 18.1351 | 302497 |
| 32 | 23944.9 | 430 372 | 198.170 | 7392.10 | 17.9735 | 308713 |
| 33 | 22825.7 | 406 427 | 191.339 | 7193.93 | 17.8056 | 315168 |
| 34 | 21756.5 | 383 601 | 184.740 | 7002.59 | 17.6316 | 321862 |
| 35 | 20735.0 | 361 845 | 178.366 | 6817.85 | 17.4510 | 328810 |
| 36 | 19759.1 | 341 110 | 172.677 | 6639.49 | 17.2634 | 336023 |
| 37 | 18826.5 | 321 351 | 167.162 | 6466.81 | 17.0691 | 343496 |
| 38 | 17935.2 | 302 524 | 162.249 | 6299.65 | 16.8676 | 351245 |
| 39 | 17083.1 | 284 589 | 157.467 | 6137.40 | 16.6591 | 359267 |
| 40 | 16268.6 | 267 506 | 153.213 | 5979.93 | 16.4431 | 367575 |
| 41 | 15489.7 | 251 237 | 149.053 | 5826.72 | 16.2196 | 376168 |
| 42 | 14744.9 | 235 748 | 145.357 | 5677.67 | 15.9884 | 385060 |
| 43 | 14032.4 | 221 003 | 141.903 | 5532.31 | 15.7494 | 394252 |
| 44 | 13350.8 | 206 970 | 139.013 | 5390.41 | 15.5025 | 403752 |
| 45 | 12698.3 | 193 619 | 136.300 | 5251.40 | 15.2477 | 413551 |
| 46 | 12073.6 | 180 921 | 134.224 | 5115.10 | 14.9849 | 423659 |
| 47 | 11475.0 | 168 848 | 132.409 | 4980.87 | 14.7144 | 434063 |
| 48 | 10901.3 | 157 373 | 131.122 | 4848.46 | 14.4362 | 444762 |
| 49 | 10350.9 | 146 471 | 130.441 | 4717.34 | 14.1507 | 455744 |
| 50 | 9822.30 | 136 120 | 130.159 | 4586.90 | 13.8583 | 466988 |
| 51 | 9314.36 | 126 298 | 130.227 | 4456.74 | 13.5595 | 478481 |
| 52 | 8825.89 | 116 984 | 130.597 | 4326.51 | 13.2546 | 490207 |
| 53 | 8355.84 | 108 158 | 131.227 | 4195.92 | 12.9440 | 502154 |
| 54 | 7903.23 | 99802.1 | 132.194 | 4064.69 | 12.6280 | 514307 |

COMMUTATION COLUMNS 4% (Continued)

| x | D_x | N_x | C_x | M_x | $1 + a_x$ | A_x |
|-----|---------|---------|---------|---------|-----------|---------|
| 55 | 7467.07 | 91898.8 | 133.337 | 3932.50 | 12.3072 | .526645 |
| 56 | 7046.53 | 84431.8 | 134.732 | 3799.16 | 11.9820 | .539153 |
| 57 | 6640.78 | 77385.2 | 136.233 | 3664.43 | 11.6530 | .551806 |
| 58 | 6249.13 | 70744.5 | 137.815 | 3528.19 | 11.3207 | .564589 |
| 59 | 5870.97 | 64495.3 | 139.549 | 3390.38 | 10.9855 | .577482 |
| 60 | 5505.61 | 58624.4 | 141.311 | 3250.83 | 10.6481 | .590457 |
| 61 | 5152.55 | 53118.7 | 143.083 | 3109.52 | 10.3092 | .603492 |
| 62 | 4811.29 | 47966.2 | 144.763 | 2966.44 | 9.96351 | .616517 |
| 63 | 4481.48 | 43154.9 | 146.264 | 2821.67 | 9.62962 | .629630 |
| 64 | 4162.85 | 38673.4 | 147.593 | 2675.41 | 9.29014 | .642687 |
| 65 | 3855.15 | 34510.6 | 148.753 | 2527.82 | 8.95182 | .655699 |
| 66 | 3558.12 | 30655.4 | 149.533 | 2379.06 | 8.61563 | .668630 |
| 67 | 3271.74 | 27097.3 | 149.894 | 2229.53 | 8.28225 | .681452 |
| 68 | 2996.01 | 23825.6 | 149.806 | 2079.64 | 7.95245 | .694137 |
| 69 | 2730.97 | 20829.6 | 149.053 | 1929.83 | 7.62718 | .706647 |
| 70 | 2476.88 | 18098.6 | 147.643 | 1780.78 | 7.30702 | .718961 |
| 71 | 2233.97 | 15621.7 | 145.349 | 1633.13 | 6.99281 | .731046 |
| 72 | 2002.70 | 13387.8 | 141.985 | 1487.79 | 6.68486 | .742890 |
| 73 | 1783.69 | 11385.1 | 137.512 | 1345.80 | 6.38288 | .754505 |
| 74 | 1577.57 | 9601.37 | 132.012 | 1208.29 | 6.08617 | .765917 |
| 75 | 1384.89 | 8023.80 | 125.666 | 1076.28 | 5.79384 | .777160 |
| 76 | 1205.95 | 6638.91 | 118.636 | 950.612 | 5.50511 | .788265 |
| 77 | 1040.94 | 5432.96 | 111.164 | 831.975 | 5.21931 | .799257 |
| 78 | 889.735 | 4392.02 | 103.369 | 720.811 | 4.93633 | .810141 |
| 79 | 752.145 | 3502.29 | 95.2720 | 617.442 | 4.65640 | .820908 |
| 80 | 627.945 | 2750.14 | 87.2275 | 522.170 | 4.37960 | .831554 |
| 81 | 516.565 | 2122.20 | 78.7785 | 434.942 | 4.10829 | .841989 |
| 82 | 417.919 | 1605.63 | 70.0404 | 356.164 | 3.84197 | .852232 |
| 83 | 331.805 | 1187.72 | 61.1163 | 286.124 | 3.57956 | .862325 |
| 84 | 257.927 | 855.910 | 52.4184 | 225.007 | 3.31842 | .872368 |
| 85 | 195.588 | 597.983 | 44.2991 | 172.589 | 3.05736 | .882409 |
| 86 | 143.766 | 402.395 | 36.7269 | 128.290 | 2.79895 | .892348 |
| 87 | 101.510 | 258.629 | 29.5766 | 91.5628 | 2.54781 | .902007 |
| 88 | 68.0293 | 157.118 | 22.6781 | 61.9863 | 2.30957 | .911170 |
| 89 | 42.7347 | 89.0891 | 16.2664 | 39.3082 | 2.08470 | .919819 |
| 90 | 24.8246 | 46.3544 | 10.8499 | 23.0418 | 1.86728 | .928182 |
| 91 | 13.0199 | 21.5298 | 6.6604 | 12.1918 | 1.65361 | .936400 |
| 92 | 5.85311 | 8.50988 | 3.56960 | 5.52580 | 1.45391 | .94408 |
| 93 | 2.05838 | 2.65677 | 1.45310 | 1.95620 | 1.29071 | .95036 |
| 94 | 0.52612 | 0.59839 | 0.43362 | 0.50311 | 1.1374 | .9563 |
| 95 | 0.07227 | 0.07227 | 0.06949 | 0.06949 | 1.0000 | .962 |

VALUATION COLUMNS 3½%

$$u_x = D_x/D_{x+1}$$

$$k_x = C_x/D_{x+1}$$

| x | u_x | k_x | x | u_x | k_x |
|-----|-----------|-----------|-----|-----------|-----------|
| 10 | 1.042 811 | 0.007 547 | 55 | 1.054 585 | 0.018 922 |
| 11 | 1.042 838 | .007 573 | 56 | 1.055 999 | .020 289 |
| 12 | 1.042 866 | .007 600 | 57 | 1.057 563 | .021 800 |
| 13 | 1.042 894 | .007 627 | 58 | 1.059 296 | .023 474 |
| 14 | 1.042 922 | .007 654 | 59 | 1.061 234 | .025 347 |
| 15 | 1.042 962 | 0.007 692 | 60 | 1.063 385 | 0.027 425 |
| 16 | 1.042 990 | .007 720 | 61 | 1.065 780 | .029 739 |
| 17 | 1.043 019 | .007 748 | 62 | 1.068 433 | .032 302 |
| 18 | 1.043 059 | .007 787 | 63 | 1.071 365 | .035 136 |
| 19 | 1.043 100 | .007 826 | 64 | 1.074 625 | .038 285 |
| 20 | 1.043 141 | 0.007 866 | 65 | 1.078 270 | 0.041 807 |
| 21 | 1.043 194 | .007 917 | 66 | 1.082 304 | .045 704 |
| 22 | 1.043 248 | .007 969 | 67 | 1.086 782 | .050 031 |
| 23 | 1.043 303 | .008 022 | 68 | 1.091 774 | .054 854 |
| 24 | 1.043 358 | .008 076 | 69 | 1.097 284 | .060 178 |
| 25 | 1.043 415 | 0.008 130 | 70 | 1.103 403 | 0.066 090 |
| 26 | 1.043 484 | .008 197 | 71 | 1.110 117 | .072 576 |
| 27 | 1.043 554 | .008 264 | 72 | 1.117 388 | .079 602 |
| 28 | 1.043 625 | .008 333 | 73 | 1.125 218 | .087 167 |
| 29 | 1.043 710 | .008 415 | 74 | 1.133 660 | .095 323 |
| 30 | 1.043 796 | 0.008 498 | 75 | 1.142 852 | 0.104 204 |
| 31 | 1.043 884 | .008 583 | 76 | 1.152 960 | .113 971 |
| 32 | 1.043 986 | .008 682 | 77 | 1.164 314 | .124 941 |
| 33 | 1.044 102 | .008 795 | 78 | 1.177 243 | .137 433 |
| 34 | 1.044 221 | .008 910 | 79 | 1.192 031 | .151 720 |
| 35 | 1.044 343 | 0.009 027 | 80 | 1.209 771 | 0.168 861 |
| 36 | 1.044 493 | .009 172 | 81 | 1.230 099 | .188 502 |
| 37 | 1.044 647 | .009 320 | 82 | 1.253 477 | .211 089 |
| 38 | 1.044 830 | .009 498 | 83 | 1.280 245 | .236 952 |
| 39 | 1.045 018 | .009 679 | 84 | 1.312 384 | .268 004 |
| 40 | 1.045 237 | 0.009 891 | 85 | 1.353 917 | 0.308 133 |
| 41 | 1.045 463 | .010 109 | 86 | 1.409 469 | .361 806 |
| 42 | 1.045 721 | .010 359 | 87 | 1.484 979 | .434 762 |
| 43 | 1.046 001 | .010 629 | 88 | 1.584 244 | .530 670 |
| 44 | 1.046 331 | .010 947 | 89 | 1.713 188 | .655 254 |
| 45 | 1.046 684 | 0.011 289 | 90 | 1.897 500 | 0.833 333 |
| 46 | 1.047 106 | .011 697 | 91 | 2.213 750 | 1.138 889 |
| 47 | 1.047 571 | .012 146 | 92 | 2.829 873 | 1.734 177 |
| 48 | 1.048 111 | .012 668 | 93 | 3.893 571 | 2.761 905 |
| 49 | 1.048 745 | .013 280 | 94 | 7.245 000 | 6.000 000 |
| 50 | 1.049 463 | 0.013 974 | 95 | | |
| 51 | 1.050 272 | .014 755 | | | |
| 52 | 1.051 176 | .015 629 | | | |
| 53 | 1.052 185 | .016 604 | | | |
| 54 | 1.053 323 | .017 704 | | | |

MOMENT OF INERTIA FOR VARIOUS BODIES

The mass of the body is indicated by m .

| Body | Axis | Moment of inertia |
|---|---|--|
| Uniform thin rod, length l | Normal to the length, at one end | $m\frac{l^2}{3}$ |
| Uniform thin rod, length l | Normal to the length, at the center | $m\frac{l^2}{12}$ |
| Thin rectangular sheet, sides a and b | Through the center parallel to b | $m\frac{a^2}{12}$ |
| Thin rectangular sheet, sides a and b | Through the center perpendicular to the sheet | $m\frac{a^2 + b^2}{12}$ |
| Thin circular sheet of radius r | Normal to the plate through the center | $m\frac{r^2}{2}$ |
| Thin circular sheet of radius r | Along any diameter | $m\frac{r^2}{4}$ |
| Thin circular ring. Radii r_1 and r_2 | Through center normal to plane of ring | $m\frac{r_1^2 + r_2^2}{2}$ |
| Thin circular ring. Radii r_1 and r_2 | Any diameter | $m\frac{r_1^2 + r_2^2}{4}$ |
| Rectangular parallelopiped, edges a , b , and c | Through center perpendicular to face ab , (parallel to edge c) | $m\frac{a^2 + b^2}{12}$ |
| Sphere, radius r | Any diameter | $m\frac{2}{5}r^2$ |
| Spherical shell, external radius r_1 , internal radius r_2 | Any diameter | $m\frac{2}{5}(r_1^5 - r_2^5)$ |
| Spherical shell, very thin, mean radius r | Any diameter | $m\frac{2}{3}r^2$ |
| Right circular cylinder of radius r , length l | The longitudinal axis of the solid | $m\frac{r^2}{2}$ |
| Right circular cylinder of radius r , length l | Transverse diameter | $m\left(\frac{r^2}{4} + \frac{l^2}{12}\right)$ |
| Hollow circular cylinder, length l , radii r_1 and r_2 | The longitudinal axis of the figure | $m\frac{(r_1^2 + r_2^2)}{2}$ |
| Thin cylindrical shell, length l , mean radius r | The longitudinal axis of the figure | mr^2 |
| Hollow circular cylinder, length l , radii r_1 and r_2 | Transverse diameter | $m\left[\frac{r_1^2 + r_2^2}{4} + \frac{l^2}{12}\right]$ |
| Hollow circular cylinder, length l , very thin, mean radius r | Transverse diameter | $m\left(\frac{r^2}{2} + \frac{l^2}{12}\right)$ |
| Elliptic cylinder, length l , transverse semiaxes a and b | Longitudinal axis | $m\left(\frac{a^2 + b^2}{4}\right)$ |
| Right cone, altitude h , radius of base r | Axis of the figure | $m\frac{3}{10}r^2$ |
| Spheroid of revolution, equatorial radius r | Polar axis | $m\frac{2}{5}r^2$ |
| Ellipsoid, axes $2a$, $2b$, $2c$ | Axis $2a$ | $m\frac{b^2 + c^2}{5}$ |

MATHEMATICAL SYMBOLS AND ABBREVIATIONS

MATHEMATICAL SYMBOLS AND ABBREVIATIONS

Symbols and Abbreviations of Commercial Arithmetic

| | | | | | |
|--------|--|---------|------------------------------|-----------|--|
| # | Number (if written before a numeral); pounds (weight), lb. (if written after a numeral.) | Apr. | April | Dr. | Debit, debtor, doctor |
| | | a/s | Account sales | ea. | Each |
| | | Aug. | August | e.g. | (exempli gratia) for example |
| | | av. | Average | etc. | And so forth |
| | | avoir. | Avoirdupois | ex. | Example, exercise, express |
| @ | At, as " @ 5¢ per C," for "at 5 cents per hundred." | bal. | Balance | exch. | Exchange |
| | | bbl. or | Barrel | exp. | Expense |
| | | brl. | | F | Fahrenheit |
| | | bk. | Bank, book | Feb. | February |
| | | bl. | Bale | f.o.b. | Free on board |
| % | Per cent; per hundred. | B/L | Bill of lading | Fri. | Friday |
| | | bu. | Bushel | frt. | Freight |
| ¢ | Cents (placed after figures) | bx. | Box | ft. or f. | Foot |
| \$ | Dollars, (prefixed before figures). | C | (centum) hundred | gal. | Gallon |
| | | cd. | Cord | gi. | Gill |
| | | cg. | Centigram | gr. | Grain |
| ✓ | Check mark | ch. | Chain | gro. | Gross |
| & | And, as in "Smith, Jones & Co." | chg. | Charge | gr. gro. | Great gross |
| | | c.i.f. | Carriage and insurance free. | guar. | Guarantee |
| c/o | Care of | ck. | Check | hf. | Half |
| A | Acre | cm. | Centimeter | hhd. | Hogshead |
| a/c | Account | cml. | Commercial | hr. | Hour |
| acct. | Account | Co. | Company, county | i.e. | (id est) that is |
| ad val | (ad valorem), according to value | c.o.d. | Cash on delivery | in. | Inch, inches |
| A.M. | (ante meridiem) in the morning, | coll. | Collection | ins. | Insurance |
| or | | com. | Commission | inst. | (instant) the present month |
| a.m. | between midnight and the following noon. | cr. | Credit, creditor, crate | int. | Interest |
| | 12:00 A.M. is noon, better 12:00 M, 12:01 A.M. is one minute after midnight. | cs. | Case | inv. | Invoice |
| | | c. or | Cent | inv'y | Inventory |
| | | ct. | | Jan. | January |
| | | cu. | Cubic | kg. | Keg, kilogram |
| | | cwt. | Hundredweight | km. | Kilometer |
| | | da. | Day | lb., lbs. | Pound, pounds |
| | | Dec. | December | lp | List price |
| | | dept. | Department | ltd. | Limited |
| | | dft. | Draft | L.S. | (locus sigillis) place for the seal |
| amt. | Amount | disc. | Discount | | |
| ans. | Answer | dm. | Decimeter | M | (mille) thousand; meridiem as in 12:00 M |
| ap. | Apothecaries' weight or measure | do. | Ditto | | |
| | | doz. | Dozen | | |
| | | dr. | Dram | | |

MATHEMATICAL SYMBOLS AND ABBREVIATIONS

Symbols and Abbreviations of Commercial Arithmetic (Continued)

| | | | | | |
|--------|-------------------|--------|------------------|--------|-----------------|
| m. | Mill, meter | P.M. | (post meridiem) | etc. | west, etc. |
| Mar. | March | or | in the 'after- | Sat. | Saturday |
| mdse. | Merchandise | p.m. | noon, between | sec. | Second |
| mi. | Mile | | noon and the | sec'y | Secretary |
| min. | Minute | | following mid- | Sept. | September |
| mm. | Millimeter | | night. 12:00 | set. | Settlement |
| mo. | Month | | P.M. is mid- | sig. | Signed, signa- |
| Mon. | Monday | | night, 12:01 | | ture. |
| mortg. | Mortgage | | P.M. is one | sq. | Square |
| N, NE, | North, North- | | minute after | stk. | Stock |
| NW, | east, North- | | noon. | Sun. | Sunday |
| etc. | west, etc. | pp. | Pages | T. | Ton |
| no. or | Number | pr. | Pair | temp. | Temperature |
| numb. | | prox. | (proximo) in the | Thu. | Thursday |
| Nov. | November | | following | treas. | Treasurer, |
| Oct. | October | | month | | treasury |
| O.K. | Correct | pt. | Pint, point | Tues. | Tuesday |
| oz. | Ounce | pwt. | Pennyweight | ult. | (ultimo) in the |
| p. | Page | (or | | | last month |
| par. | Paragraph | dwt.) | | via | By way of |
| pay't | Payment | qr. | Quire | viz. | (videlicet) |
| pc. | Piece | qt. | Quart | | namely |
| pd. | Paid | rd. | Rod, road | vol. | Volume |
| per | By, by the, as in | rec'd | Received | Wed. | Wednesday |
| | "per C," "per | rec't | Receipt | wk. | Week |
| | M," "per doz." | rm. | Ream | wt. | Weight |
| pdf. | Preferred | S, SE, | South, South- | yd. | Yard |
| pk. | Peck, pecks | SW, | east, South- | yr. | Year |
| pkg. | Package | | | | |

Symbols Belonging to Plane Geometry

| | | | |
|-------|--|-------|--|
| ∠ | Angle. Use "rt ∠" not "L" for "right angle." Write out the word "arc" rather than using "∩." On ∠ABC, B is the vertex, A, C, points on the sides of the angle. | △ | Triangle |
| ⊥, ⊥s | Perpendicular, perpendiculars. | □ | Square. Use "rect." not □ for "rectangle," and use "trap." not △ for trapezoid. |
| ∥, ∥s | Parallel (to), parallel lines. | ○, ⊙s | Circle, circles. ⊙ A(B) designates the circle with center at A and passing through the point B. ⊙ (ABC), designates the circle passing through given distinct points, A, B, C. |
| □ | Parallelogram (vertices are named in counter-clockwise order, starting at any vertex). | ≅ | (is) congruent (to). |
| | | ~ | (is) similar (to). |

MATHEMATICAL SYMBOLS AND ABBREVIATIONS

Symbols Belonging to Plane Geometry (Continued)

| | | | |
|---------|--|--|---|
| \sim | (is) homothetic (to); (is) similar (to) and similarly placed (with). | \overrightarrow{AB} | Directed segment, A to B. |
| $\#$ | (is) homothetically congruent (to); or otherwise stated, (is) congruent (to) and similarly placed (with). In case of line segments, this becomes, (is) parallel (with) and congruent (to). | $ (AB)$ | Line (of infinite length) containing points A and B. |
| \cong | (is) equivalent (to), (in area or volume). | $\uparrow(AB)$ | Directed line (of infinite length) containing points A and B, and in the direction from A to B. |
| AB | Length of line segment between A and B. | R | cross-ratio, anharmonic ratio. |
| | | $\frac{P}{\overline{\Lambda}}, \overline{\Lambda}$ | (is) perspective with, (is) perspective with, from center P. |
| | | $\overline{\Lambda}$ | (is) projective with. |

General Mathematical Symbols and Abbreviations

"Bold-face" type—To indicate vectors. In manuscript and at the black-board, bold-faced type is variously indicated by wavy underscoring, or enclosure in a circle, or even by wavy overscoring. Some persons use German type.

Half-spaces—In writing numbers with many recorded digits, half-spaces (rather than commas or other marks) may well be used to separate convenient groups of digits. Thus $\pi = 3.14159\ 26536 -$.

Superscripts—To indicate: 1. powers, as in x^2 , $(a-x)^n$, etc. In modern practice $a^0 = 1$ always by definition (even for $a = 0$). Also in ∞' , ∞^2 , etc., indicating number of degrees of freedom. Wherever the context restricts the value of a to non-negative (real) values and n to positive integers, $a^{1/n}$ means the non-negative (real) n th root of a . For complex numbers, x^n is defined as $e^{n(\log x)}$, where the principal value of $\log x$ is to be taken. In tables 0.05314 may be used to indicate 0.00000314. Note special use of $\sin^n x$ for $(\sin x)^n$ except for $n = -1$, also for $\cos^n x$, etc. 2. symbolic powers, or order of iteration, as in T^n or in $D^n (= d^n/dx^n)$, or in inverse functions as in \sin^{-1} , \cos^{-1} , \sinh^{-1} , etc. 3. order of differentiation, as in y' ("y prime"), y'' ("y second," or "y double prime"), . . . , $y^{(N)}$, 4. feet and inches, as in 3'4". 5. degrees, minutes, seconds, as in 34°5'17". Do not omit ° for common angles. Write 0°, 30°, 45°, 60°, etc., not 0, 30, 45, 60, etc. Do not use superscript, r , for radians. Write 180° = π rad, but write $\cos(\pi/3)$ for $\cos 60^\circ$. 6. days, hours, minutes, seconds, as in 10^d3^h27^m5.3^s. 7. degrees of temperature as in 104°. Where C (for Centigrade) or F (for Fahrenheit) is given, recent usage approves the omission of the °, thus 100C = 212F, and -40C = -40F. 8. For use with integral sign \int , and with vertical bar $|$, see these symbols.

Dot-accents—To indicate derivatives with respect to time, (Newton's notation), as in \dot{x} for x -component of velocity, and \ddot{x} for x -component of acceleration.

Subscripts—To indicate: 1. position in a sequence, set, or matrix, as in $a_1, a_2, a_3, \dots, a_n, \dots$, or $a_0x^n + a_1x^{n-1} + \dots + a_rx^{n-r} + \dots + a_n$ or in

MATHEMATICAL SYMBOLS AND ABBREVIATIONS

- $\begin{pmatrix} a_{11}a_{12}a_{13} \\ a_{21}a_{22}a_{23} \end{pmatrix}$. 2. general distinguishing mark. Two subscripts may be written adjacently without commas as a_{11} and to be read "a sub one one," not "a sub eleven." A subscript is sometimes enclosed in parentheses as in $F(0)_1$ where such distinction seems demanded. For special uses see associated symbols.
- Juxtaposition**—To indicate: 1. the algebraic product, as in $2bxy$. 2. the logical product as in AB where A and B are given classes, and in symbolic logic. Also written with centrally placed dot as $A \cdot B$. 3. the group product, as in ST (the result of performing first S , then T , or in aH , the co-set consisting for given a of all operations ah , where h is in H). 4. general operational or functional combination as in dy/dx , $\sin x$, $\log x$, $\max y$, $\lim x_n$, etc. 5. sequence of points or other elements determining a geometric figure, as line AB , parallelogram $ABCD$, $\angle ABC$, etc. 6. sum of products (in tensor notation) when index appears as subscript for one factor and superscript for another. Thus $a_i x^i$ means $\sum_i a_i x^i$, in tensor notation.
- ()**—Parentheses ("round brackets") to indicate: 1. aggregation, as in $(a + b)$. $(a - b) = a^2 - b^2$. 2. argument of function, as in $f(x)$, $g(x, y)$, etc. 3. sequence or set, as in $a = (a_i)$, $x = (x_i)$, (x, y, z) , etc. 4. matrix, as in $\begin{pmatrix} a_{11}a_{12}a_{13} \\ a_{21}a_{22}a_{23} \end{pmatrix}$ also written as $\begin{bmatrix} a_{11}a_{12}a_{13} \\ a_{21}a_{22}a_{23} \end{bmatrix}$. 5. permutation (or substitution) in group theory as in $\begin{pmatrix} a_1 a_2 a_3 \\ b_1 b_2 b_3 \end{pmatrix}$ where a_i is replaced by b_i ($i = 1, 2, 3$). 6. binomial coefficient, as in $\binom{n}{r} = n!/[r!(n - r)!]$. This is also designated by $C_{n,r}$ or ${}_nC_r$. For n, r , positive integers, $\binom{-n}{r} = (-1)^r \binom{n + r - 1}{r}$, $\binom{n}{-r} = 0$, by definition. 7. cycle or cyclic permutation (in group theory) as in (a_1, a_2, a_3) for $\begin{pmatrix} a_1 a_2 a_3 \\ a_2 a_3 a_1 \end{pmatrix}$. 8. greatest common divisor, as in $(30, 42) = 6$, $(7, 5) = 1$. 9. inner product as in (ab) , $= \sum_i a_i b_i$. 10. segment or open interval, as in (a, b) , for system of values of x , where $a < x < b$.
- Superscript ()**—To indicate: 1. general index as distinguished from exponent. 2. index of order of derivative as in $y, y', \dots, y^{(n)}, \dots$. 3. "factorial," as in $x^{(r)} = x(x - 1) \dots (x - r + 1)$. By definition $x^{(-r)} = 1/[(x + 1)(x + 2) \dots (x + r)]$.
- []**—Brackets ("square brackets"), to indicate: 1. aggregation. 2. argument of function as with $()$. 3. greatest integer in, as $[2] = 2$, $[-7/3] = -3$. 4. inner product (for coefficients in normal equations in the method of least squares), as in $[aa]$, $[XY]$, etc. 5. outer product of vectors. Other notations are Vab and $a \times b$. 6. divided difference (in formal interpolation). $[x_i] = y_i$, $[x_i, x_{i+1}] = (y_{i+1} - y_i)/(x_{i+1} - x_i)$, \dots , $[x_i, x_{i+1}, \dots, x_{i+r}] = ([x_{i+1}, \dots, x_{i+r}] - [x_i, \dots, x_{i+r-1}])/(x_{i+r} - x_i)$. 7. range of points (in projective geometry) as in $[P]$. 8. base (basis) of Abelian group, as in $[a, b, \dots, k]$. 9. module or ideal, as $[2] = [0, \pm 2, \pm 4, \dots, \pm 2n, \dots]$. 10. Christoffel symbol, as in $\begin{bmatrix} mn \\ p \end{bmatrix} = \frac{1}{2} \left(\frac{\partial g_{pm}}{\partial x^n} + \frac{\partial g_{pn}}{\partial x^m} - \frac{\partial g_{mn}}{\partial x^p} \right)$. 11. closed interval, as in $[a, b]$ for system of values of x where $a \leq x \leq b$.

MATHEMATICAL SYMBOLS AND ABBREVIATIONS

Subscript—Note. The use of adjacent subscripts, rather than of indices placed directly below is recommended on account of its availability for running text, and its economy of space and of expense in type setting. Thus use

\sum_i rather than \sum_i , \int_a^b rather than \int_a^b , etc.

{ }—Braces ("curly brackets") to indicate: 1. aggregation, as in $\{(x-a)(x-b)\}^2$. 2. class of (in theory of aggregates), where the general element only is mentioned, as in $\{a_i\} = [a_1, a_2, a_3]$, ($i = 1, 2, 3$). 3. Christoffel symbol, as in $\left\{ \begin{smallmatrix} m & n \\ p \end{smallmatrix} \right\} = g^{rp} \left[\begin{smallmatrix} m & n \\ p \end{smallmatrix} \right]$.

< >—Angle brackets to indicate: 1. aggregation. 2. closed interval as with $[]$.

| |—Vertical bars, to indicate: 1. absolute value (modulus of complex number), as $|a + ib|^2 = a^2 + b^2$. 2. magnitude of (for vectors) as $a = |a|$. 3. determinant, as in $\begin{vmatrix} a & b \\ c & d \end{vmatrix} = ad - bc$. The use of the notation $|a_{ij}|$ for the determinant of the matrix (a_{ij}) , is common but is ambiguous. The notation $\det(a_{ij})$ may be used for this determinant.

||—Double bars, to indicate: 1. matrix as in $\begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \end{bmatrix}$ or in $[a_{ij}]$. 2. generalized length (for metrical spaces), as in $\|f\|^2 = \int f^2(x) dx$.

(], [), —For intervals, as $(a, b]$, for system of values of x for which $a < x \leq b$, and $[a, b)$, for system of values of x for which $a \leq x < b$. Similarly $(a, b >$, and $< a, b)$ are sometimes used for these respectively.

⊃—1. contains (or containing) as proper sub-class. 2. implies (or implying).

⊇—contains (or containing) as sub-class. (Some writers use, \supset , for this.)

⊂—(is) contained as proper sub-class within.

⊆—(is) contained as sub-class within. (Some writers use, \subset , for this.)

≡—1. (is) identical with. \equiv_x indicates (is) identical with for all values of x for which both members are defined. 2. (is) congruent to (with respect to indicated modulus) as in $a \equiv b \pmod{m}$. 3. (is) equivalent to (in formal logic).

=—(is) equal (to).

<—(is) less than.

>—(is) greater than.

≤ or ≤—(is) less than or equal to. Sometimes read (in the case of real numbers) as "(is) not greater than."

≥ or ≥—(is) greater than or equal to. Sometimes read (in the case of real numbers) as "(is) not less than."

≠—1. (is) not identically equal (to). (Not "identically unequal to"), is unequal to for at least one value. 2. (is) not congruent (to).

≠—(is) not equal (to).

≤—1. (is) not equal (to), (for real quantities). 2. (Sometimes when explained by context) less than or greater than respectively.

~—1. (is) formally, asymptotically, or approximately equal to. (The context should make the meaning specific.) Do not use \doteq for "approximately equal to." 2. (is) similar (to). 3. not (in some works on formal logic).

MATHEMATICAL SYMBOLS AND ABBREVIATIONS

- 1. approaches (as a limit), as in $\lim_{x \rightarrow a} f(x) = b$, $f(x) \rightarrow b$, as $x \rightarrow a$, etc. (Do not use \doteq). Not usually employed with long expressions. 2. leads to, validates, implies (in logic). 3. corresponds to.
- ↔—1. mutually implies (in logic). 2. in one-to-one correspondence with, corresponds reciprocally to.

Superscript $\overrightarrow{\quad}$ —directed line as \overrightarrow{AB} .

- |—Vertical bar, to indicate: 1. value at, as in $f(x)|_a = f(a)$, or $f(x)|_{x=a} = f(a)$. 2. value between as in $f(x)|_b^a = f(b) - f(a)$. 3. is a divisor of, divides (in number theory) as $3|6$, or $(x-a)|(x^2 - a^2)$. 4. inner product (with parentheses) as $(a|b) = \sum_i a_i b_i$.

\ or /—Stroke, mark of cancellation as in $\cancel{3}x = \beta$, $x + \cancel{\beta} = \gamma$.

- /—Solidus, or oblique rule, to indicate: 1. actual or symbolic division, as in $3/7$, $(x-a)/(x-b)$, d/dx , dy/dx , d^2y/dx^2 . Do not write ambiguously $a - b/c - d$, but $(a-b)/(c-d)$ or $a - (b/c) - d$, as may be intended. Do not write a/bc but $(a/b)c$ or $a/(bc)$ as intended. Write a proportion as $a/b = c/d$ not $a:b::c:d$. Where A, B, C, D designate displayed expressions, write the proportion as $\frac{A}{B} = \frac{C}{D}$. In commercial typing in place of $8\frac{5}{12}$, it is usual to write 8-5/12. The solidus form a/b , adapted to running text should be used where conveniently possible, rather than the displayed form $\frac{a}{b}$. 2.

quotient or factor group (in group theory) as G/H , (where H is a normal subgroup of G). 3. per, as in ft/sec. 4. discount symbol, as in Cash 6, 4/5, 2/30, n/90 indicating 6% discount for immediate payment, 4% discount if paid within 5 days, 2% discount if paid within 30 days, no discount thereafter, but face amount of bill is due (net) not later than the 90th day. 5. shilling, (in British currency) as 3/6d, or 10/ -.

Superscript $\overline{\quad}$ —Vinculum. This may be regarded as obsolescent for general use as a mark of aggregation due to its unsuitability for monotype setting. In conjunction with the radical sign it is widely used, but may often be avoided. There is little logical or historical basis for using $\sqrt{2}$ rather than $\sqrt[2]{2}$. For a longer expression, one may write $\sqrt{(x^2 + a^2)}$ rather than $\sqrt{x^2 + a^2}$. Instead of $\sqrt{x-a}(x-b)$, one might write $(x-b)\sqrt{(x-a)}$. In geometry, the vinculum may be used for line segments as in \overline{AB} .

Superscript $\overline{\quad}$ —Bar. To indicate: 1. complex conjugate of, as \bar{z} . This is somewhat inconvenient for "upper extended" letters and capitals as \bar{b} , \bar{h} , \bar{X} , etc. Also indicated by *conj*, as *conj* $(x + iy) = x - iy$ or by use of a "star" as in z^* . 2. arithmetic mean value of, as in $\bar{x} = \sum_i x_i/n$. 3. closure of (in topology), as in \bar{E} (the closure of E). 4. "least upper," as in $\overline{\lim}$, and \bar{B} for least upper limit and least upper bound, respectively. See "sup."

Subscript $\underline{\quad}$ —To indicate: 1. italics (in manuscript). 2. "greatest lower," as in $\underline{\lim}$, and \underline{B} , for greatest lower limit, and greatest lower bound respectively. See "inf."

—horizontal rule, sign of division, as in $\frac{x-a}{x+a}$. Ordinarily the solidus form, adapted to running text, is preferred, as in $(x-a)/(x+a)$. When

MATHEMATICAL SYMBOLS AND ABBREVIATIONS

numerator and denominator are both complicated, the displayed form using horizontal rule may be avoided by writing " A/B , where $A = \dots$, and $B = \dots$."

- (centrally placed)—Minus sign. To indicate: 1. subtraction as in $7 - 2 = 5$, $a^2 - b^2 = (a - b)(a + b)$. 2. overestimate, as in $3.5-$. 3. approach through negative values as in $-\infty$ and -0 . 4. region where variable indicated by context is negative (in graphs). 5. logical difference (in theory of classes). 6. in $(-)^n$, the sign expressed by $(-1)^n$.
- (on line)—1. decimal point. In the decimal representation of a number between 0 and 1, the cipher, 0, should (except in tables) appear before the decimal point. Thus 0.314 not .314. Notation by powers of 10, ("scientific notation") is recommended, especially when recording approximate values; thus to four significant figures, 3.140×10^9 and 3.140×10^{-6} . 2. (sometimes used in quoting bond prices) as in 95.17 for $95\frac{1}{2}$. 3. (sometimes used in recording mental age) as in 12.3 for 12 yr. 3 mo. 4. (in symbolic logic) as mark of punctuation separating terms, also as, "and."
- :—Colon. To indicate: 1. hours, in recording time, as in 4:10 p.m. 2. ratio (an obsolescent form) as in $a:b$. The form a/b is preferred. 3. (in symbolic logic) as mark of punctuation separating groups of terms, as in $p \cdot p \supset q : \supset q$.
- (centrally placed)—1. mark of algebraic multiplication, particularly where mere juxtaposition would be ambiguous, as in $\overline{AB} \cdot \overline{CD}$. 2. (for vectors), the mark of inner or dot multiplication as in $a \cdot b = ab \cos < ab$. Other notations are (ab) and $S ab$.
- • • (preferably centrally placed)—"three dots" meaning "and so forth," or "and so forth up to." Particularly in relation to the sequence of natural numbers, as in $1, 2 \dots, n, \dots$; or $a_0, a_1, \dots, a_n, \dots$, or $1, \dots, m$.
- ∴—hence, therefore.
- ∴, ∵, ∴, etc.—(in symbolic logic), marks of punctuation stronger than • and :
- ditto.
- + plus sign. To indicate: 1. addition, as in $2 + 3$, $a + b$, 10^{a+1} . 2. underestimate, as in $3.5+$. 3. continued fraction as in $a_0 + \frac{1}{a_1 + \frac{1}{a_2 + \dots}}$ for $a_0 + \frac{1}{a_1 + \frac{1}{a_2 + \dots}}$. 4. approach through positive values as in $+\infty$, and in $+0$.
- 6. region where variable indicated by the context is positive, (in graphs).
- 6. logical addition (in theory of classes). 7. "... or ... or both," (in formal logic). . Note: In writing series indicate sign before and after dots of omission, as $a_0 + a_1 + \dots + a_n$, or $1 - \frac{1}{2} + \frac{1}{3} + \dots + (-1)^{n-1} \frac{1}{n}$.
- 8. in abstract group theory a group or co-set may be expressed as the sum of its elements.
- ±—1. "plus or minus." The repeated appearance of \pm as in $\pm a \pm b \pm c$ is ambiguous. In many cases the sign \pm before a term which appears repeatedly is intended to indicate the systematic use of the positive determination or of the negative determination throughout. Thus one may write $(a \pm b)^3 = a^3 \pm 3a^2b + 3ab^2 \pm b^3$. Where the context restricts the value of a to non-negative (real) values, \sqrt{a} means the non-negative (real) square

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- root of a . Hence when both signs are desired, write \pm before the radical. For roots of a quadratic equation $ax^2 + bx + c = 0$, use \pm as in $(-b \pm \sqrt{b^2 - 4ac})/(2a)$. 2. (in theory of observation), "with a probable error of." As in 17.2 ± 0.5 cm.
- \mp —"minus or plus respectively." Used in context where \pm has appeared previously, as in $(a \pm b)(a^2 \mp ab + b^2) = a^3 \pm b^3$. Here upper signs are to be taken throughout, or else lower signs. The notation $\pm a \mp b \pm c$ is ambiguous, meaning perhaps one of the four values $\pm(a - b) \pm c$, or one of the two values $\pm(a - b + c)$.
- \times —1. times, (sign of algebraic multiplication). Used chiefly in arithmetic, as in $2 \times 2 = 4$, 7.3×10^4 . 2. (for vectors) the sign of outer or cross multiplication. 3. (for classes) the Cartesian product. Thus $A \times B$ is the class of all ordered pairs (a, b) where a is an element of A , and b of B .
- \div —sign of division. Used chiefly in arithmetic. Should be replaced by solidus, $/$, where convenient.
- $\sqrt[n]{}$ —square root of, n th root of. (See discussion under "superscript," and under "vinculum"). By custom, for a positive, $\sqrt{(-a)}$ means usually $i\sqrt{a}$, rather than $-i\sqrt{a}$, but the latter unambiguous forms are preferred.
- !—"factorial," as in $3! = 1 \cdot 2 \cdot 3 = 6$. $0! = 1$, (by definition). The elementary arithmetic definition of factorial n , may be replaced in favor of the definition as a special case of the Gamma function $\Gamma(x)$. For n a natural number, $n! = \Gamma(n + 1)$, $= \int_0^\infty x^n e^{-x} dx$. For n a large natural number, Stirling's asymptotic formula (extended) yields $n! \sim \sqrt{2n\pi} (n/e)^n \left(1 + \frac{1}{12n} + \frac{1}{288n^2} - \frac{139}{51840n^3} - \dots\right)$. Note: Do not use the obsolescent form \underline{n} for $n!$
- $\int, \int_a^b, \int_a^x, \iint, \int_c^d$ —Integral signs. (use preferably bold-face type)
- $\int_a^b \int_c^d f(x, y) dx dy$ denotes $\int_a^b \left(\int_c^d f(x, y) dx \right) dy, = \int_a^b dy \int_c^d dx f(x, y)$.
- \oint —curvilinear integral over closed path free from singularities. (Use preferably bold-face type.)
- §—section, or article.
- ¶ or ¶—paragraph.
- \propto —varies as. Instead of $y \propto x$ one may write $y = kx$, k being the constant factor of proportionality.
- ∇ —nabla—To indicate: 1. linear vector operator $\left(\frac{\partial}{\partial x}, \frac{\partial}{\partial y}, \frac{\partial}{\partial z}\right)$ as used also in divergence, gradient, and curl (or rotation). 2. backward difference (in interpolation theory) $\nabla a_n = a_n - a_{n-1}$.
- ∇^2 —Laplace operator.
- \square —D'Alembertian operator.
- $^{\circ}, ', ", \dots, (N) \dots$, (superscript)—superscript numbers. See "superscripts."
- ∞ —infinity. Use $+\infty$ or $-\infty$ respectively, where direction of approach along real numbers is to be indicated. Otherwise use ∞ rather than $\pm\infty$. Note: " $n \rightarrow \infty$," may be read "as n increases without bound."

ℵ—Aleph (initial Hebrew letter) transfinite cardinal number, in particular that of all real numbers. \aleph_0 (aleph null) first transfinite cardinal.

α—Alpha. To indicate: 1. (in analytic geometry of 3 dimensions), direction angle with X -axis. 2. angular acceleration. 3. (in statistics) $\alpha_0 = 1$, $\alpha_1 = 0$, $\alpha_2 = 1$, $\alpha_3 = \mu_3/\sigma^3$, $\alpha_4 = \mu_4/\sigma^4 = \mu_4/\mu_2^2$. 4. (in mathematical astronomy), right ascension (also indicated by R.A.) 5. angle of triangle at A , opposite side a . 6. root of algebraic equation as in $a(x - \alpha)(x - \beta)(x - \gamma) = 0$.

B—(Greek Beta)— $B(m, n) = \Gamma(m)\Gamma(n)/\Gamma(m + n)$, (Eulerian Beta-function).

β—Beta. To indicate: 1. (in analytic geometry of 3 dimensions), direction angle with Y -axis. 2. (in statistics), $\beta_1 = \alpha_3^2 = \mu_3^2/\mu_2^3$, $\beta_2 = \alpha_4 = \mu_4/\mu_2^2$. 3. angle of triangle at B , opposite side b . 4. root of algebraic equation. See α .

Γ— $\Gamma(x)$ Gamma-function. See "!" Among numerous definitions equivalent for positive real values of x , are the two following: (i) $\Gamma(x) = \lim_{n \rightarrow \infty} \frac{1 \cdot 2 \cdots n}{x(x+1) \cdots (x+n-1)} n^{x-1}$, $x > 0$. (ii) $\Gamma(x) = \int_0^\infty e^{-t} t^{x-1} dt$, $R(x) > 0$.

γ—Gamma. To indicate: 1. (in analytic geometry of 3 dimensions) direction angle with Z -axis. 2. Euler or Mascheroni constant. (Also indicated by C .) $\gamma = \lim_{n \rightarrow \infty} \left(\frac{1}{1} + \frac{1}{2} + \cdots + \frac{1}{n} - \log n \right) = 0.57721 \ 56649 \ 01532 \ 86060 \ 65120 \cdots$ 3. angle of triangle at C , opposite side c . 4. radius of geodesic curvative. 5. universal constant of gravitation $= 6.675 \times 10^{-8} \text{ cm}^3/(\text{gm. sec}^2)$. 6. root of algebraic equation, see α .

Δ—Delta. To indicate: 1. triangle (in plane geometry). (For right triangle, write $\text{rt}\Delta$, not Δ). Also area of triangle. 2. increment, as in Δx , Δf , $f(x + \Delta x)$, etc. 3. forward difference (interpolation theory). $\Delta a_n = a_{n+1} - a_n$. 4. Laplacian operator $\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}$, or $\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} + \frac{\partial^2}{\partial z^2}$ also designated by ∇^2 . 5. selected square root of the discriminant of a given polynomial, as in $\Delta^2 = b^2 - 4ac$ for the polynomial $ax^2 + bx + c$. 6. triangular number, (of form $(n^2 - n)/2$). 7. Legendre's radical, $\Delta(\varphi)^2 = 1 - k^2 \sin^2 \varphi$.

δ—Delta. To indicate: 1. positive constant dependent upon ϵ that may be chosen initially as near to zero as desired. (In theory of limits, of continuity, etc.) 2. variation of. 3. (in interpolational theory) central difference $\delta y_{c+i+\frac{1}{2}} = y_{c+i+1} - y_{c+i}$. 4. (in mathematical astronomy) apparent declination. 5. number of double points, or nodes (Plücker number). 6. (in statistics) deviation. 7. force of interest, $e^\delta = 1 + i$, (in mathematics of finance). 8. Kronecker Delta, $\delta_{ij} = 0$ for $i \neq j$, $= 1$ for $i = j$. In tensor notation, also δ_i^j . One has $\delta_{ij} = \begin{pmatrix} 0 \\ i-j \end{pmatrix}$ or $C_{0,i-j}$. 9. unit elongation (in strength of materials).

∂—curly d . To indicate: 1. partial differentiation as in $\partial f(x, y)/\partial x$. 2. The Jacobian operator, as in $\partial(u, v, w)/\partial(x, y, z)$. This is variously represented, sometimes as $J\left(\frac{u, v, w}{x, y, z}\right)$ etc. 3. a specified square root of the discriminant D . (also sometimes as Δ .)

ϵ —Epsilon. To indicate: 1. positive constant, that may be chosen initially independently as near to zero as desired. (In theory of limits, of continuity, etc.) 2. primitive root of unity. 3. (is) member of, (relation of element to containing class). 4. eccentricity of conic section, usually better designated by e . 5. (in mathematical astronomy) obliquity of ecliptic. 6. an ϵ -number is a transfinite ordinal of a certain limiting type. Note: Do not use ϵ or ε for Napierian base except in engineering. See e .

\notin —(is not a member of.)

ζ —Zeta. To indicate: 1. Riemann Zeta-function $\zeta(s) = \sum_{n=1}^{\infty} n^{-s}$ (for $s > 1$). 2. (in statistics) a test of linearity. $\zeta = \eta^2 - r^2$.

η —Eta. To indicate: 1. general variable or unknown constant, analogous to y as in case of moving system of coordinates, etc. Used in ordered set (ξ, η, ζ) . 2. a confocal coordinate. See ξ . 3. (in statistics), correlation ratio. 4. order-type of the aggregate of all rational numbers.

Θ —Theta. To indicate: 1. Theta-function. See ϑ . 2. absolute temperature (where t is used for time).

θ —Theta. To indicate: 1. general angular displacement, (in trigonometry and analytic geometry). 2. (in plane polar coordinates (r, θ)) angle from initial ray to radius vector, $x = r \cos \theta$, $y = r \sin \theta$. 3. (in cylindrical coordinates (r, θ, z)) angle from initial radial half-plane to radial half-plane containing radius vector. 4. (in spherical coordinates (r, θ, φ)) co-latitude (measured from zenith) and (in astronomy) zenith distance. This notation is traditional in mathematical physics. In texts on analytic geometry, usage varies, θ being employed frequently for the longitude. See φ . 5. Theta-function. See ϑ . 6. (in formal theory of operations), a displacement operator. 7. ordinary temperature (when t is used for time).

ϑ —Theta-function. Definitions and notations vary widely. For elliptic Theta-functions the notation here given is that followed by Whittaker and Watson. Here ϑ_i designates the value of $\vartheta_i(0, q)$, ϑ_i' , the value of $d\vartheta_i(z, q)/dz$. ($i = 1, 2, 3, 4$). These are defined by $\vartheta_1(z, q) = 2q^{1/4} \sin Z - 2q^{3/4} \sin 3z + 2q^{5/4} \sin 5z - \dots$ $\vartheta_2(z, q) = 2q^{1/4} \sin z + 2q^{3/4} \sin 3z + 2q^{5/4} \sin 5z + \dots$ $\vartheta_3(z, q) = 1 + 2q \cos 2z + 2q^4 \cos 4z + 2q^9 \cos 6z + \dots$ $\vartheta_4(z, q) = 1 - 2q \cos 2z + 2q^4 \cos 4z - 2q^9 \cos 6z + \dots$

ι —Iota, number of inflexions (a Plücker number).

\imath —inverted Iota, (in formal logic) the unique element fulfilling description stated.

κ —Kappa, number of cusps. (A Plücker number).

Λ —Lambda, sometimes used for null-class.

λ —Lambda. To indicate: 1. general linear parameter (e.g., in a pencil), as in $F + \lambda G$. 2. running index, as in x_λ ($\lambda = 1, 2, \dots$). 3. longitude (in mathematical astronomy). 4. characteristic value (as in λ_i) in theory of linear differential equations of second order, linear integral equations, etc. 5. order-type of the aggregate of all real numbers.

μ —Mu. To indicate: 1. running index, usually used with λ , as in $x_\lambda y_\mu$. 2. general linear parameter, when used with λ , as in $\lambda F + \mu G$. 3. (in statistics) moment, about the arithmetic mean, as in $\mu_k = \sum f_i (x_i - \bar{x})^k$, $\mu_2 = \sigma^2 =$ variance. 4. μ_x , force of mortality $= -d(\log_e l_x)/dx$. 5. (in number theory) inversion function of Moebius and Mertens.

•—Nu. To indicate: 1. running index, usually with λ and μ . 2. (in statistics) moment about arbitrary origin A (in "short method") as in $\nu_h = \sum_i f_i (x_i - A)^h$.

ξ—Xi. To indicate: 1. general variable, or unknown constant analogous to x , as in moving systems of coordinates, etc. 2. a confocal coordinate as in

(i) confocal ellipses and hyperbolas, $\frac{x^2}{a^2 - \lambda} + \frac{y^2}{b^2 - \lambda} = 1$, $-\infty < \xi < b^2 < \eta < a^2$.

(ii) confocal ellipsoids and hyperboloids of revolution, $\frac{x^2}{a^2 - \lambda} + \frac{y^2 + z^2}{b^2 - \lambda} = 1$, $-\infty < \xi < b^2 < \eta < a^2$.

(iii) confocal parabolas, $y^2 + 2\lambda \cdot (x - \lambda) = 0$, $-\infty < \xi < 0 < \eta < +\infty$.

(iv) confocal paraboloids of revolution, $y^2 + z^2 + 2\lambda(x - \lambda) = 0$, $-\infty < \xi < 0 < \eta < +\infty$.

(v) confocal ellipsoids and hyperboloids, $\frac{x^2}{a^2 - \lambda} + \frac{y^2}{b^2 - \lambda} + \frac{z^2}{c^2 - \lambda} = 1$, $-\infty < \xi < c^2 < \eta < b^2 < \zeta < a^2$.

(vi) confocal paraboloids, $\frac{x^2}{a^2 - \lambda} + \frac{y^2}{b^2 - \lambda} = 2z - \lambda$, $-\infty < \xi < b^2 < \eta < a^2 < \zeta < +\infty$.

II, II_i, II_{i=m}ⁿ, II_(R) or II—1. product of terms with index i , or j , etc. ranging from m to n , or over R . Do not use II_i, II_{i=m}ⁿ, etc. (Bold-faced type preferred.)

2. (in some formal logical treatments) "for every."

II_{ij}, II_{ijk}, . . . —II_iII_j, II_iII_jII_k, etc.

π—Pi. 1. the ratio of the length of circumference of a circle, to the diameter. $\pi = 3.14159 \ 26535 \ 89793 \ 23846 \dots$ 2. general notation for plane, projectivity, projective, period, etc.

ρ—Rho. 1. radius of geodesic curvature. 2. proportionality factor, as in $\rho X_i = \sum_j a_{ij} x_j$.

$\sum_i, \sum_{i'}, \sum_{i=m}^n, \sum_{(R)}$ or $\sum_{(R)}$ —Sigma. 1. summation, sum of terms of index i , or j , etc., ranging from m to n , or over range R . Do not use $\sum_i, \sum_{i=m}^n$, etc. (bold-faced type preferred).

2. (on some formal logical treatments) "for at least one." 3. (in number theory) $\Sigma_{d|n}$ summation extended over all divisors of n . 4. (in mathematical astronomy) Σ -pt is the intersection of the meridian with the equator.

$\Sigma_{ij}, \Sigma_{ijk} \dots$ — $\Sigma_i \Sigma_j, \Sigma_i \Sigma_j \Sigma_k$, etc.

σ—Sigma. To indicate: 1. radius of torsion. 2. (in statistics) standard deviation $\sigma^2 N = \sum_i (x_i - \bar{x})^2 f_i$. 3. (in number theory), $\sigma_k(n)$ = sum of k th powers of divisors of n . 4. any one of several analogous Sigma-functions. The simplest elliptic Sigma-function $\sigma(x)$ is related to the Weierstrassian \wp function by $\wp u = -d^2 \log \sigma u / du^2$. One has $\sigma u = u \left\{ 1 - \frac{g_2}{2} \frac{u^4}{5!} - 6g_3 \frac{u^6}{7!} - \frac{9}{4} g_2^2 \frac{u^8}{9!} - 18g_2 g_3 \frac{u^{10}}{11!} - \dots \right\}$ 5. proportionality factor, usually used with ρ .

τ—Tau. To indicate: 1. number of bitangents (a Plücker number). 2. time (when t is used for temperature). 3. torsion (of curve in space).

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↑—Upsilon. (In mathematical astronomy) vernal equinox.

φ—Phi. To indicate: 1. general functional symbol, especially for polynomials. 2. (in spherical coordinates, (r, θ, φ) , longitude from x to y in right-handed system. In some astronomical work the z -axis points to the zenith, θ is the zenith-distance, and φ is the west azimuth. In some works on analytic geometry the roles of θ and φ are interchanged, although the system given is traditional mathematical physics. $x = r \sin \theta \cos \varphi$, $y = r \sin \theta \sin \varphi$, $z = r \cos \theta$. 3. (in geocentric coordinates, (r, φ, λ)) φ = latitude (not co-latitude as with spherical coordinates). 4. (in plane polar coordinates (r, φ) .) Used chiefly as specialized case of spherical coordinates $(r, \pi/2, \varphi)$. See θ . 5. inclination of plane curve, $\tan \varphi = dy/dx = m$. 6. (in number theory.) Euler's function or indicatrix. $\varphi(n)$ is the number of positive integers not exceeding n and prime to n . 7. $\varphi_i(x)$, characteristic function, see λ_i . 8. argument in Legendre's elliptic integrals. $E(\varphi, k) = \int_0^\varphi \Delta(\varphi) d\varphi$, $F(\varphi_1 k) =$

$\int_0^\varphi d\varphi/\Delta(\varphi)$. 9. the normal probability function of Laplace and Gauss in the form $\varphi(t) = \frac{1}{\sqrt{2\pi}} e^{-t^2/2}$. 10. $\varphi_n(x)$, sometimes used for Bernoulli polynomial. See $B_n(x)$.

χ—Chi. (In statistical theory) χ^2 is a measure of goodness of fit, devised by Karl Pearson. $\chi^2 = \sum (f_i - Np_i)^2 / (Np_i)$ for N items, with p_i the probability of appearances and f_i the frequency for items in an i th class.

ψ—Psi. To indicate: 1. general functional symbol (usually with φ). 2. angle from radius vector to tangent of plane curve. 3. (with geocentric coordinates in mathematical astronomy), co-latitude. See φ .

Ω—Omega. To indicate: 1. a certain annihilator in the theory of binary concomitants. 2. (with subscript) transfinite ordinals of certain minimal type. 3. (in geometry of the triangle) Ω, Ω' , the Brocard points.

ω—Omega. To indicate: 1. angular velocity. 2. first transfinite ordinal, order-type of the aggregate of all natural numbers. 3. imaginary cube root of unity, related to i , by $\omega = (-1 + i\sqrt{3})/2$. 4. $\omega_1, \omega_2, \omega_3$, half-periods of Weierstrassian \wp -function.

Δ—1. A vertex, and the associated angle of $\triangle ABC$. See α . 2. A_{ij} , algebraic complement of a_{ij} in determinant, D . $A_{ij} = D/d_{a_{ij}}$. 3. (in astronomy) azimuth. 4. (in astronomy) astronomical unit, mean geocentric distance to the sun. 5. acres. 6. area.

AM—arithmetic mean. See also superscript --- .

Ans.—answer.

AP—arithmetic progression.

Ax—axiom.

a—1. (in elementary algebra) initial term in arithmetic or geometric progression. 2. (with subscript) coefficient in Fourier series, $(a_0/2) + \sum_{n=1}^{\infty} (a_n \cos nx + b_n \sin nx)$. 3. (with two indices) element in matrix or determinant, as in $\begin{pmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \end{pmatrix}$ or $\begin{vmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{vmatrix}$. 4. (in elementary geometry) apothegm. 5. (in geometry of triangle) first side-line, also length of first side of the triangle. 6. (in elementary analytic geometry) x -intercept. 7. (in elementary analytic geometry) semi-major axis of ellipse or semi-transverse axis of hyperbola,

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etc. (When equations are in normal form.) For central conics and quadrics the a is usually associated with x , as in $(x^2/a^2) + (y^2/b^2) = 1$, even when a may be less than b , or as in $-(x^2/a^2) + (y^2/b^2) = 1$, where a is the semi-conjugate axis.

abs—absolute value of.

acc—acceleration.

am—amplitude function. $\varphi = \text{am } u$, where $u = F = \int_0^\varphi d\varphi/\Delta(\varphi)$.

amp—amplitude of vibration.

approx—approximate(ly).

arc (in “arc sin” etc.)—inverse. Also written \sin^{-1} etc. Do not use “arc” for inverse of hyperbolic functions. Write \sinh^{-1} , etc.

arg—argument. For r and θ real, θ is the argument of $re^{i\theta}$.

av—average.

B—1. (With subscripts) Bernoulli numbers and polynomials. To indicate what usage among many is being followed in any given case, authors would do well to list the values of the first few Bernoulli numbers as for example, $B_1 = \frac{1}{2}$, $B_2 = \frac{1}{6}$, $B_3 = 0$, $B_4 = -\frac{1}{30}$, etc. The Bernoulli polynomials, are defined as $B_n(x) = \sum_{r=0}^n \binom{n}{r} B_r x^{n-r}$, and satisfy $B_n(x+1) - B_n(x) = nx^{n-1}$ with the choice of notation for Bernoulli numbers given above. (Also designated by $\varphi_n(x)$.) **2.** bound (general symbol). \bar{B} , \underline{B} designate least upper, and greatest lower bound respectively. Preferred notations are “sup” and “inf” respectively. **3.** a vertex and the associated angle of $\triangle ABC$. See β . **4.** (in elementary solid geometry), area of base of a solid.

b—1. (in elementary geometry) length of base of plane figure. b, b' , parallel bases of trapezoid. **2.** (in elementary analytic geometry) y -intercept. **3.** (in elementary analytic geometry) semi-axis. See a . **4.** (in geometry of the triangle) second side-line, also length of second side of the triangle.

bei(z)—Thomson-Bessel function, $\text{bei}(z) = \frac{(\frac{1}{2}z)^2}{(2!)^2} = \frac{(\frac{1}{2}z)^6}{(6!)^2} + \frac{(\frac{1}{2}z)^{10}}{(10!)^2} = \dots$

$\text{ber}(z) \pm i \text{bei}(z) = J_0(zi\sqrt{\pm i}) = I_0(z\sqrt{\pm i})$.

ber(z)—Thomson-Bessel function. (See $\text{bei}(z)$.) $\text{ber}(z) = 1 - \frac{(\frac{1}{2}z)^4}{(4!)^2} + \frac{(\frac{1}{2}z)^8}{(8!)^2} - \dots$

C—1. arbitrary constant of integration. **2.** (in elementary geometry) circumference of circle; also, circle. **3.** general symbol for curve. **4.** (with subscripts) combination, as in $C_{n,r}$ or ${}_nC_r$, the number of combinations of n things taken r at a time (without repetitions). The form ${}_nC_r$ or even nC_r is widely used but the notation $C_{n,r}$ or $C(n,r)$ or $\binom{n}{r}$ is to be preferred. **5.**

Roman numeral for “hundred.” **6.** Euler or Mascheroni constant. Also designated by γ . (See γ .) **7.** (chiefly as subscript) contour of integration.

8. Centigrade, degree Centigrade, as -52°C .

Ci—cosine integral function, $\text{Ci}(x) = \int_x^\infty (\cos u/u) du$.

CF—(in elementary differential equations) complementary function.

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c—1. (in geometry of triangle) third side-line, also length of third side of triangle. 2. (in elementary analytic geometry), z -intercept. 3. (in elementary analytic geometry) semi-axis. (See *a*.)

cis— $\text{cis } \theta = \cos \theta + i \sin \theta = e^{i\theta} = \exp(i\theta)$. The latter forms preferred.

cls—class, set, or aggregate.

cn—cosine amplitude function. (Jacobian elliptic function.)

colog—cologarithm (of).

conj—(complex) conjugate (of). See superscript $\overline{}$.

cos—cosine (of).

cos⁻¹—inverse cosine (of). Also written arc cos.

cosh—hyperbolic cosine (of). Do not write Cos nor $\mathfrak{C}of$ (in German letters).

cosh⁻¹—inverse hyperbolic cosine of. Do not write arc cosh.

csc—cosecant (of).

csc⁻¹—inverse cosecant (of). Also written arc csc.

ctn—cotangent (of).

ctn⁻¹—inverse cotangent (of). Also written arc ctn.

ctnh—hyperbolic cotangent (of). Do not write Ctn, nor $\mathfrak{C}tn$ (in German letters).

ctnh⁻¹—inverse hyperbolic cotangent of. Do not write arc ctnh.

cu—cubic.

cum—cumulative

cvrs—covered sine (of) $\text{cvrs } x = 1 - \sin x$.

D—1. differential operator, as in $Dy = y'$, $d_x f(x, y) = \partial f / \partial x$. 2. Roman numeral for "five hundred." 3. general symbol for denominator, or for determinant. 4. discriminant of binary form, or of polynomial. 5. (in statistical theory), (with subscripts 0, 1, \dots , 10), decile marks. 6.

$D(a_1, a_2, \dots, a_n)$ sometimes designates the Vandermonde determinant

$$\begin{vmatrix} 1a_1 & \dots & a_1^{n-1} \\ \dots & \dots & \dots \\ 1a_n & \dots & a_n^{n-1} \end{vmatrix}$$

Def—definition.

Dem—demonstration, proof.

d—1. (in elementary algebra), common difference in arithmetic progression.

2. differential operator, as in d^2y/dx^2 . 3. (in elementary geometry) diameter.

4. (as superscript) days, as in $2^d3^h17^m$. 5. (British currency) pence.

deg—degree, degrees.

det—determinant of, as in $\det(a_{ij})$.

div—divergence of, also indicated by ∇ .

dn— $\text{dn}(z)$, a Jacobian elliptic function.

\exists —(there) exists.

$\exists!$ —there exist uniquely.

E—1. E, F, G fundamental differential quantities of first order for surfaces.

2. $E(\varphi, k)$, Legendre's normal elliptic integral, of the second kind, $E =$

$\int_0^\varphi \Delta(\varphi) d\varphi$. 3. east. 4. (in Euler's polyhedral formula) number of edges of

polyhedron. 5. displacement operator, $E(f(x)) = f(x + 1)$. 6. (in mathematical astronomy) equation of time.

Ei—exponential integral function $Ei(x) = \int_x^\infty du/(ue^u)$.

Eq—equation.

Ex—exercise.

e—1. base of natural (or Napierian) logarithms. In place of e^A one may write $\exp A$. $e = 2.71828\ 18284\ 59045\ 23536 \dots \log_{10} e = M = 0.43429\ 44819\ 03251\ 82765 \dots \log_e 10 = 1/M = 2.30258\ 50929\ 94045\ 68402$. In some engineering work, where e is used otherwise, the base of natural logarithms is designated by ϵ . 2. eccentricity of a conic. 3. $e_1 = \wp(\omega_1)$, $e_2 = \wp(\omega_2)$, $e_3 = \wp(\omega_3)$, for Weierstrassian elliptic functions. 4. (in mathematical astronomy) eccentricity of earth's orbit. 5. (in elementary solid geometry) length of lateral edge (of right pyramid, prism, etc.).

erf—error function, $\operatorname{erf}(x) = (\sqrt{2/\pi}) \int_x^\infty e^{-t^2} dt$.

exp—exponential function of, as in $\exp(a^2 + b^2)$ for $e^{a^2+b^2}$. One could also write this " e^u where $u = a^2 + b^2$."

exsec—exsecant function, $\operatorname{exsec} \theta = \sec \theta - 1$.

F—Force.

F—1. general symbol for function or functional. 2. the second fundamental differential quantity of first order for surfaces. See *E*. 3. (in Euler's polyhedral formula) number of faces of polyhedron. 4. $F(\varphi, k)$, Legendre's normal elliptic integral of the first kind, $F = \int_0^\varphi d\varphi/\Delta(\varphi)$. See Δ and *E*. φ is here the amplitude of F , $\varphi = \operatorname{am} F$. 5. $F(a, b; c; x)$, hypergeometric function. 6. Fahrenheit, degree Fahrenheit, as in 70F.

FS—Fourier series.

Fig.—figure.

Fr—frontier set of.

f—1. general symbol for function or functional. 2. f_i , frequency of X_i in univariate table. 3. frequency of vibration. 4. feet as in f/s , feet per second. Preferable ft/sec.

ft—feet. See also f and $'$.

G—1. general symbol for group. 2. the third fundamental differential quantity of first order for surfaces. 3. $G(x_1, \dots, x_n; \xi_1, \dots, \xi_n)$ Green's function for two points in n -space. 4. (constant) linear group of points on an algebraic curve. See g . 5. gravitational constant.

G.C.T.—Greenwich civil time.

GCD—greatest common divisor.

GCS—greatest common subgroup.

GF—Galois field, as in $GF(p^n)$.

GM—geometric mean.

GP—geometric progression.

g—1. general function symbol, used with f . 2. (terrestrial) gravitational attraction. 3. (variable) linear group of points on an algebraic curve. See G . 4. g_i , frequency of y_i in bivariate table. 5. general coefficient in tensor, as in $g_i^k x^i y^j z_k$.

gd—Gudermannian. $e^u = \tan\left(\frac{\pi}{4} + \frac{1}{2} \operatorname{gd} u\right)$.

grad—gradient of. Also written ∇ .

- H**—1. general symbol for subgroup, as in G/H , particularly for normal (or self-conjugate) subgroup. 2. Hessian, as $H(f) = \det \frac{\partial^2 f}{\partial x_i \partial x_j}$. 3. $H_n(x)$, n th Hermite polynomial, $H_n(x)e^{-x^2/2} = (-1)^n D^n e^{-x^2/2}$. 4. $H(P_1, P_3; P_2, P_4)$ is the proposition that P_1 and P_3 separate harmonically P_2 and P_4 . 5. ortho-center of triangle. 6. $H(q_1, \dots, q_n, t, p_1, \dots, p_n)$ Hamiltonian function (in mathematical physics). 7. mean curvature of surface, $H = EG - F^2$. 8. (in mathematical astronomy) hour-angle. Also designated by t .
- HCF—highest common factor.
- HM—harmonic mean.
- HP—(in elementary algebra) harmonic progression.
- Hyp.—hypothesis.
- h**—1. (in interpolation theory), distance, between uniformly spaced ordinates. 2. class interval, in x . 3. increment of x . Also Δx . 4. (as superscript) hours, as in $8^h 15^m$. 5. (terminal) hyperbolic, as in \sinh , \tanh^{-1} , etc. 6. altitude ("height").
- hav—haversine (of). $\text{hav } x = (\text{vers } x)/2$.
- I**—1. general symbol for interval, and for definite integral. 2. Roman numeral for "one." Write IV not IIII, IX not VIIII. 3. $I(\)$, imaginary part of, also designated by $\Im(\)$, or $\text{Im}(\)$. 4. $I_n(z)$, the Bessel function "of imaginary argument," $I_n(z) = \sum_{m=0}^{\infty} \frac{(\frac{1}{2})^n z^{n+2m}}{m! \Gamma(n+m+1)}$. 5. (in geometry of triangle) in center. 6. sometimes used for the identity as an operation in a group.
- \Im —(Black letter) imaginary part of. See I .
- Im—imaginary part of. See I .
- i**—1. running index, as in a_i , $i = 1, \dots, n$. 2. one of the two imaginary square roots of -1 . (In electrical engineering, when it is used for the current, j is used for this imaginary unit.)
- i**— i, j, k , unit vectors in a right-handed rectangular system. $i \times j = k$, $j \times k = i$, $k \times i = j$.
- inf.—("infimum") greatest lower bound.
- J**—1. Jacobian as in $J\left(\frac{u,v,w}{x,y,z}\right)$, also designated by $\partial(u,v,w)/\partial(x,y,z)$. 2. $J_n(z)$, Bessel coefficient of order n . 3. Jacobian curve. 4. Jacobian group of points in a linear series of groups of points on an algebraic curve.
- j**—1. running index, with i . 2. (sometimes in electrical engineering) $\sqrt{(-1)}$. See i .
- j**—a unit vector. See i .
- K**—1. specific curvature of surface. 2. kernel of integral equation, as in $u(x) = f(x) + \lambda \int_a^b \bar{K}(x,t)u(t)dt$. K_n , the n th iterated kernel is then defined recursively by $K_1 \equiv K$, $K_n(x,y) = \int_a^b K_{n-1}(x,t)K(t,y)dt$. Also designated by $K^{(n)}$. 3. K, iK' , periods for Jacobian elliptic functions. 4. Symmedian (Lemoine) center of triangle. 5. $K_n(z)$, the Bessel function ("second solution") $\lim_{\nu \rightarrow n} \frac{(-1)^n}{2} \left[\frac{I_{-\nu}(z) - I_{\nu}(z)}{\nu - n} \right]$

MATHEMATICAL SYMBOLS AND ABBREVIATIONS

- k**—1. proportionality factor for variation. Do not use $y \propto x$. 2. running index, used with h . 3. k, k' , modulus and complementary modulus respectively of Jacobian elliptic functions. 4. class interval, in y . 5. increment in y . Also Δy .
- k**—a unit vector. See i .
- kei, ker**—Bessel functions defined as real for real z and satisfying, $\ker(z) + i \operatorname{kei}(z) = K_0(z\sqrt{\pm i})$.
- L**—1. general symbol for linear function. 2. general symbol for linear system, or linear space. 3. limit, as in $\lim_{n \rightarrow \infty} e^{-n} = 0$. See "lim." 4. Roman numeral for "fifty." 5. length. Also designated by l . 6. first fundamental differential quantity of second order for surfaces. 7. Lexis ratio, $\sigma/\sqrt{pq/s}$, for sets of s objects each. 8. $L_n(x)$, n th Laguerre polynomial, $L_n(x)e^{-x}n! = D^n(e^{-x}x^n)$.
- LCD**—lowest common denominator.
- LCM**—lowest (or least) common multiple.
- l**—1. running index. 2. (in elementary algebra) last term (of arithmetic or geometric progression). 3. $l = \cos \alpha$, directional cosine, (with x -axis). 4. length. Also designated by L .
- lat.**—latitude.
- li**—logarithmic integral or integral logarithm function, $\operatorname{li}(x) = \int_0^x du/\log u$.
- lim**—limit (), $\overline{\lim}$, least upper limit, $\underline{\lim}$, greatest lower limit.
- ln**—(Sometimes) natural logarithm of.
- log**—logarithm (of). In theoretical work, the natural base, e , is understood; in numerical computation with tables, the base 10 is understood unless otherwise specified. Some writers use "ln" for natural logarithm of. Where ambiguity is otherwise likely, indicate the base, thus $\log_b x$, $\log_{10} x$, $\log_e x$.
- long**—longitude.
- M**—1. Roman numeral, thousand. 2. arithmetic mean. Also designated by superscript bar, as \bar{X} , or by AM. 3. centroid (in geometry of triangle). 4. second fundamental differential quantity of second order for surfaces.
- M.D.**—mean deviation.
- Md**—median.
- Mm**—mid-mean, arithmetic mean of data in range Q_1 to Q_3 .
- Mo**—mode.
- m**—1. general symbol for natural number, or integer, usually used with n . 2. slope of line, dy/dx . 3. $m = \cos \beta$, directional cosine (with y -axis). 4. m_a, m_b, m_c , median lines, lengths of medians of triangle. 5. (as subscript) meridian measurement. 6. class of an algebraic plane curve (a Plücker number). 7. (superscript) minutes, as in $10^d 13^b 5^m$. 8. meters.
- max**—maximum (of).
- meas**—measure (of).
- mi**—miles.
- min**—1. minimum (of). 2. minutes
- mod**—1. modulus (of), as in $\operatorname{mod}(re^{i\theta}) = r$. 2. modulo as in $7 \equiv -3 \pmod{5}$.
- N**—1. third fundamental differential quantity of second order for surfaces. 2. north. 3. total frequency in a statistical distribution.

MATHEMATICAL SYMBOLS AND ABBREVIATIONS

n—1. general symbol for natural number or integer. 2. $n = \cos \gamma$, directional cosine (with z -axis). 3. order or degree of plane algebraic curve (a Plücker number). 4. (in elementary algebra) number of terms in finite progression. 5. (sometimes) total frequency. See N . 6. outward normal to surface, as in $\cos(\theta, n)$.

O—1. origin of coordinates. 2. circumcenter of triangle. 3. of comparable order with, as $\sum_{n=0}^N n = O(N^2)$.

o—of inferior order to, as $\log n = o(n)$.

ord—order.

P—1. general symbol for polynomial, in particular the interpolational polynomial. 2. product moment. Also expressed by p . 3. general symbol for point. The common notation indicating the coordinate system used as $P(x, y, z)$, $P(r, \theta, \varphi)$, etc., is not recommended. 4. general probability distribution function, in particular any one of Pearson's standard types, or Poisson's forms. 5. $P_n(x)$, Legendre polynomial, $2^n n! P_n(x) = D^n(x^2 - 1)^n$. 6. total force due to pressure. 7. function, as in $Pdx + Qdy$, and in $y' + P(x)y = Q(x)$. 8. $P_{n,r}$ or ${}_nP_r$, or $P(n, r)$, number of permutations of n distinct things taken r at a time (without repetitions), $= n!/r!$. 9. general potential due to finite number of particles. In Newtonian case $P = \sum m_i/r_i$. See U and W . 10. horizontal parallax. 11. north celestial pole.

PE—probable error. See \pm .

Post.—postulate.

Prob.—1. problem. 2. probability.

Prop.—proposition.

PS—power series.

Pt.—point.

\wp —Weierstrassian elliptic function.

p—1. general symbol for prime number. 2. semi-latus rectum. 3. probability ratio. 4. genus (or deficiency) or plane algebraic curve (a Plücker number). 5. perpendicular distance from origin to given line or plane.

6. p_n , numerator of n th convergent of continued fraction $a_0 + \frac{1}{a_1 + \frac{1}{a_2 +$

\dots ($p_{-1} = 0$, $p_0 = 1$), $p_1 = a_0$, $p_{n+1} = a_n p_n + p_{n-1}$. 7. p_{12} , p_{13} , p_{14} , p_{23} , p_{24} , p_{34} , line coordinates (point system). 8. sometimes "per," as in "rpm," revolutions per second. This use is not recommended. 9. perimeter.

10. $p(n)$, total number of partitions of n . 11. p_i , impulse component.

p.—page.

pos.—positive.

Q—1. general symbol for quadratic form or quadratic manifold. 2. Q_1 , Q_3 first and third quartile marks. (Q_2 is the median, Md.) 3. function, as in $Pdx + Qdy$, and in $y' + P(x)y = Q(x)$. 4. $Q(P_1, P_2, P_3; P_4, P_5, P_6)$, quadrangular set of six points.

QD—quartile deviation.

Q.E.D.—"Quod erat demonstrandum" which was to be proved.

Q.E.F.—"Quod erat faciendum" which was to be constructed.

q—1. complementary probability, $q = 1 - p$. 2. q_n , denominator of n th convergent of continued fraction, $a_0 + \frac{1}{a_1 + \frac{1}{a_2 + \dots}}$ ($q_0 = 0$), $q_1 = 1$,

MATHEMATICAL SYMBOLS AND ABBREVIATIONS

- $q_{n+1} = a_n q_n + q_{n-1}$. 3. $q_{12}, q_{13}, q_{14}, q_{23}, q_{24}, q_{34}$, line coordinates (plane system). 4. q_1, q_2 , quartile distances from the median. 5. q_i , force component.
- R —1. general symbol for remainder. $R_n(x)$, remainder after n turns in power-series in x . 2. radius, in particular circumradius of triangle. 3. real part of. Also indicated by \Re (Black letter), and Re . 4. general symbol for range of variable, as in $\int_{(R)}$.
- \Re —(Black letter) real value of. See R .
- R . A.—right ascension. Also designated by α .
- Re —real value of. See R .
- RMS—root-mean-square. $\sqrt{(\sum_{i=1}^n x^2/n)}$.
- r —1. general running index, as in r th term. 2. radius (see R), in particular in radius of triangle. 3. coefficient of linear correlation, correlation coefficient. 4. (in elementary algebra) common ratio between successive terms in a geometric progression. 5. distance, in polar and in spherical coordinates; projected distances in cylindrical coordinates. 6. (sometimes) revolutions, as in $r.p.m.$ (revolutions per minute). 7. (sometimes) (superscript) radians, as in $2\pi^{(r)}$. (This usage is not recommended.)
- rad—1. radius. 2. radians. Where no units are indicated angles are measured in radians, $\sin 30$ means "sine of 30 radians," not $\sin 30^\circ$. Do not write $\sin a^r$ or $\sin a^{(r)}$ for $\sin a$ (where a is measured in radians), since superscript r is sometimes interpreted as "revolutions."
- rot—rotation or curl of vector. Also designated by $\nabla \times$.
- S —1. general symbol for space, as S_n , space of n dimension. See L . 2. general symbol for sum, as in S_n , sum of first n terms of given sequence or series. See s . 3. south. 4. standard error of estimate. 5. radius of spherical curvature of curve.
- Si—1st sine-integral function $\text{Si}(x) = \int_0^x (\sin u/u) du$. See si .
- S.T.—siderial time.
- s —1. general running index. Used with r . 2. general symbol for sum, as in s_n sum of first n terms of sequence or series. See S . 3. (in elementary algebra), sum of arithmetic or of geometric progression. 4. $s_k(n)$, sum of k th powers of first n natural numbers. 5. s_k , sum of the k th powers of the roots of an algebraic equation. 6. arc length. 7. slant height. 8. (usually as superscript) seconds. 9. semi-interquartile range. 10. semi-perimeter of triangle, $s = (a + b + c)/2$. 11. (sometimes) number of individuals in sample. 12. root-mean-square deviation about arbitrarily assumed origin, (in "short method").
- sec—secant (of).
- \sec^{-1} —inverse secant (of). Also designated by arc sec .
- sech—hyperbolic secant (of). Do not use Sec or $\text{\textcircled{S}ec}$ (in German letters).
- sech^{-1} —inverse hyperbolic secant of. Do not use arc sech .
- si—2nd sine-integral function, $\beta_i(x) = \int_{-\infty}^x (\sin u/u) du$. See $\tilde{\text{Si}}$.
- sgn—(signum) sign (of), more generally for z complex, $\text{sgn } z = z/|z|$
- sin—sine (of). Do not use Sin .
- \sin^{-1} —inverse sine (of). Also designated by arc sin .
- sinh—hyperbolic sine (of). Do not use Sin , or $\text{\textcircled{S}in}$ (in German letters).

MATHEMATICAL SYMBOLS AND ABBREVIATIONS

\sinh^{-1} —inverse hyperbolic sine of. Do not use "arc sinh."

sk—skewness of frequency distribution.

sn—(Jacobian elliptic function), sine amplitude.

sq—square.

sup—(supremum) least upper bound. Sometimes designated by L.U.B., or l.u.b.

T —1. total time, (as in time of flight of projectile). 2. clock time. 3. general symbol for transformation, T^n , n th iterate of T . 4. tons. 5. (in logic), true or truth. 6. absolute temperature.

Th—theorem.

t —1. general variable or parameter. 2. time. See τ . See "dot accent." 3. ordinary temperature. See T , τ , θ .

tan—tangent (of).

\tan^{-1} —inverse tangent (of). Also designated by arc tan.

tanh—hyperbolic tangent (of). Do not use Tan or $\mathfrak{T}an$ (in German letters).

\tanh^{-1} —inverse hyperbolic tangent (of). Do not use arc tanh.

U —general (line surface or volume) potential. In Newtonian case, $U = \int_{(L)} \frac{\mu dL}{r}$ or $\int_{(S)} \frac{\mu dS}{r}$, or $\int_{(V)} \frac{\mu dV}{r}$. See P and W .

u —1. general variable, especially dependent variable or real part thereof. See w . 2. u_n , Lucas' function $u_n = (\alpha^n - \beta^n)/(\alpha - \beta)$, α , β , roots of given quadratic.

V —1. Roman numeral, five. 2. (in Euler's polyhedral formula) number of vertices. 3. general harmonic function. 4. volume.

v —(linear) velocity.

v —1. general variable, especial dependent variable, used with u , or coefficient of pure imaginary part thereof. See w . 2. v_n , Lucas' function $\alpha^n + \beta^n$, α , β , roots of given quadratic. See u_n . 3. speed.

W —1. west. 2. general potential of double layer. In Newtonian case,

$$W = \int_{(S)} v \frac{\partial}{\partial n} \left(\frac{1}{r} \right) dS, = - \int_{(S)} \frac{v}{r^2} \cos(r, n) dS. \text{ See } P \text{ and } U. \quad 3. \text{ Wronskian,}$$

$$W = \begin{vmatrix} y_1 & y_1' & \dots & y_1^{(n-1)} \\ \dots & \dots & \dots & \dots \\ y_n & y_n' & \dots & y_n^{(n-1)} \end{vmatrix}.$$

4. total weight. Also designated by Wt . 5. work (or energy). Also designated by Wk .

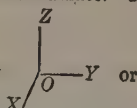
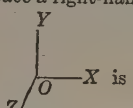
Wt .—weight. See W .

w —1. general symbol for variable, particularly dependent variable. Used with u and v as in $J\left(\frac{u, v, w}{x, y, z}\right)$, etc. 2. dependent complex variable, $w = u + iv$, or $w(z) = u(x, y) + iv(x, y)$ where $z = x + iy$, x, y, u, v , real.

X —1. Roman numeral, ten; as in XCIII, etc. 2. X_i , original numerical data for x -variates, (previous to change of origin or scale). 3. general symbol for variable point, particularly on x -axis. 4. function, as in $Xdx + Ydy + Zdz$ or $\frac{dx}{X} = \frac{dy}{Y} = \frac{dz}{Z}$.

MATHEMATICAL SYMBOLS AND ABBREVIATIONS

x —1. general symbol for independent variable or unknown. 2. first rectangular coordinate. In space a right-handed coordinate system such as indicated

by  or  is recommended. The former with OZ

directed to the zenith is more common. 3. real part of independent complex variable $z = x + iy$.

Y —1. Y_i , original numerical data for y -variates (previous to change of origin or scale). 2. function as in $Xdx + Ydy + Zdz$, or $\frac{dx}{X} = \frac{dy}{Y} = \frac{dz}{Z}$.

y —1. general symbol for dependent (real) variable. 2. general symbol for second independent variable, r unknown. 3. second rectangular coordinate. See x . 4. pure imaginary coefficient, in independent complex variable, $z = x + iy$.

Z —zenith.

$Z.T.$ —zone time.

z —1. independent complex variable, $z = x + iy$. 2. general symbol for third independent variable or unknown. 3. third rectangular coordinate. See x . 4. axial coordinate in cylindrical coordinates (r, θ, z) . 5. zenith distance, $(90^\circ - h)$.

Selected Symbols Used in Financial and Actuarial Theory

α —net premium in first policy year.

β —net premium in each policy year after the first.

δ —force of interest (and of discount) $e^\delta = 1 + i$.

ω —terminal recorded age in mortality table, "limiting" age.

A_x —commutation symbol, present value of net single premium for whole life policy on (x) , $= M_x/D_x$.

$a_{\overline{n}|i}$ —present value of annuity for unit periodic payment, $= (1 - v^n)/i$.

$a_{\overline{n}|i}^{(p)}$ —present value of an annuity of 1 per annum at interest rate i , payable p times a year (in installments of $1/p$ each).

a_x —commutation symbol, present value of (ordinary) whole life annuity on (x) of unit annual payment.

$a_x^{(m)}$ —present value of whole life annuity on (x) , of unit annual payment, payable m times a year.

$n|a_x$ —present value of whole life annuity, on (x) , deferred n years for unit annual payment.

$a_{x:\overline{n}|}$ —present value of temporary life annuity, on (x) , for n years, for unit annual payment.

$a_{\infty|i}$ —present value of perpetuity at rate of interest, i .

$a_{\infty|i}$ —present value of perpetuity due at rate of interest, i .

a_x —commutation symbol present value of whole life annuity due, on (x) , of unit annual payment.

$\ddot{a}_{\overline{n}|i}$ —present value of an annuity due, for unit periodic payments at interest rate i .

MATHEMATICAL SYMBOLS AND ABBREVIATIONS

B —book value.

B_k —book value, after k years.

C —1. original cost. 2. capitalized cost.

C_x —commutation symbol, $= v^{x+1}d_x$.

c_x —natural premium at age x , $= C_x/D_x$.

D —total simple discount.

D_b —total bank discount.

D_c —cash discount, where for example, "terms 4/10, 2/30, n/90" designates 4% discount for payment within 10 days, 2% thereafter but within 30 days, payable net in 90 days.

D_t —trade discount.

D_x —commutation symbol, $= v^x l_x$.

d —rate of simple discount, $= 1 - v = 1 - (1 + i)^{-1} = i/(1 + i)$.

d_x —number dying between ages x and $x + 1$, according to mortality table (for 100,000 alive at age 10).

E —present value of expectation.

${}_nE_x$ —present value of an n -year pure endowment to (x) , $= v^n l_{x+n}/l_x$.

e_x —curtate expectation of life for (x) , $= (l_x + \dots + l_\omega)/l_x$.

${}_e x$ —complete expectation of life, for (x) , $= e_x + \frac{1}{2}$.

F —1. net-cost-rate factor. 2. face value of bond.

I —total interest (ordinary simple).

I' —total interest (exact, simple).

i —rate of interest (effective).

$j_{(x)}$ —nominal rate of interest convertible p times a year corresponding to effective annual rate i , $= p[(1 + i)^{1/p} - 1]$.

k_x —valuation symbol, $= C_x/D_{x+1}$.

${}_n k_x$ —valuation symbol, $= (M_x - M_{x+n})/D_{x+n}$, [${}_1 k_x = k_x$], accumulated cost of insurance.

L —1. list price (for trade discount). 2. salvage value.

l_x —number living at age x according to mortality table (for 100,000 alive at age 10).

N_x —("open bar N "), commutation symbol, $= D_x + D_{x+1} + \dots + D_\omega$.

n —number of conversion periods (for compound interest).

P —principal.

P_b —bank proceeds.

P_x —net annual premium for ordinary whole life policy, on (x) , for unit annual payment $= A_x/(1 + a_x)$.

${}_r P_x$ —net annual premium for r -payment life policy, $= M_x/(N_x - N_{x+r})$.

p —1. probability of success. 2. interest period/payment interval.

p_x —probability of living for another year for a person of age x (according to mortality table).

${}_n p_x$ —probability that a person aged x will live n years, $= l_{x+n}/l_x$.

p_{xy} —the probability that (x) and (y) will survive jointly for one year.

${}_n p_{xy}$ —the probability that (x) and (y) will survive jointly for n years.

q —probability of failure, $= 1 - p$.

q_x —probability of dying within a year for a person of age x (according to mortality table).

${}_n q_x$ —probability that (x) will die within n years.

MATHEMATICAL SYMBOLS AND ABBREVIATIONS

- ${}_nq_x$ —the probability that (x) will die between ages $x + n$ and $x + n + 1$.
- R —1. periodic payment or "rent." 2. replacement cost. 3. repair charge (annual).
- S —amount.
- S —1. scrap value. 2. amount of sinking fund. 3. subscription price. 4. amount (at simple interest).
- s —amount (at compound interest) for unit principal $= (1 + i)^n$.
- $s_{\overline{n}|i}$ —amount of annuity for unit periodic payment, $= [(1 + i)^n - 1]/i$.
- $s_{\infty|i}$ —amount of perpetuity at interest rate i .
- s_{∞} —amount of perpetuity due.
- $s_{\overline{n}|i}$ —amount of an annuity due, for unit periodic payments.
- $s_{\overline{n}|i}^{(p)}$ —amount at end of n years of annuity of 1 per annum at interest rate i , payable p times a year (in installments of $1/p$ each).
- u_x —valuation symbol, $= D_x/D_{x+1}$.
- ${}_nu_x$ —valuation symbol, $(N_x - N_{x+n})/D_{x+n}$, [${}_1u_x = u_x$], accumulated value of individual survivors payments.
- V —purchase price (of bond).
- ${}_tV_x$ —terminal reserve of t^{th} policy year on policy on (x) of unit annual payment.
- v —present value (at compound interest) for unit principal, $= (1 + i)^{-1}$.
- W —wearing value, $=$ original cost minus scrap value.
- x —age of insured (to nearest year).
- (x) —a person aged x (for use with mortality table).
- $x]$ —where $[x] + t$ indicates a life, now aged $x + t$, who was accepted for insurance t years ago at age x .

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